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THE
AMERICAN
ECLECTIC DISPENSATORY.

BY

JOHN KING, M. D.,

PROFESSOR OF OBSTETRICS AND THE DISEASES OF WOMEN AND CHILDREN, IN THE CINCINNATI
ECLECTIC MEDICAL INSTITUTE; FORMERLY PROFESSOR OF MATERIA MEDICA, THERA-
PEUTICS, AND MEDICAL JURISPRUDENCE IN THE MEMPHIS INSTITUTE.

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AMERICAN

ECLECTIC DISPENSARY

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ABBREVIATIONS, ETC.

The Abbreviations employed in the work, both where credit is given or for other purposes, are as follows:

TO

ALL TRUE FRIENDS

OF

ECLECTIC REFORM

THROUGHOUT THE UNION

This Work

IS RESPECTFULLY INSCRIBED

BY

THE AUTHOR

ABBREVIATIONS, ETC.

The Abbreviations employed in the work, both where credit is given or for other purposes, are as follows:

<i>Nat. Ord.</i> ,	Natural Order.
<i>Sex. Syst.</i> ,	Sexual System of Linnæus.
<i>U. S.</i> ,	United States Pharmacopœia.
<i>U. S. Disp.</i> ,	United States Dispensatory.
<i>Dub.</i> ,	Dublin Pharmacopœia.
<i>W. S. M.</i> ,	Mr. Wm. S. Merrell.
<i>T. V. M.</i> ,	Professor T. V. Morrow.
<i>R. S. N.</i> ,	" R. S. Newton.
<i>Z. F.</i> ,	" Z. Freeman.
<i>J. K.</i> ,	" J. King.

In a few places, in speaking of doses, they are given "from half to three grains, instead of "from half a grain to three grains;" also, in speaking of liquids, when measured by fluidounces or fluidrachms, the term "fluid" is occasionally omitted. The reader will please observe and rectify the omissions, as well as any other that may not have been observed by us.

TO OUR READERS.

It may be proper to remark here, that the United States Eclectic Dispensatory, by King and Newton, is now out of print, and Professor R. S. Newton, in consequence of the time required by his extensive surgical and medical practice, as well as in the preparation of his work on Theory and Practice, and his editorial labors in the Eclectic Journal, has disposed of his interest in that Dispensatory to the author of the present volume. In consequence of this disposition, much of the matter contained in that work has been transferred to the following pages. And the author takes this occasion especially to express his feelings of indebtedness to Prof. Newton for this, as well as for many valuable ideas and items of information which are herein embodied.

PREFACE.

IN laying before the public the AMERICAN ECLECTIC DISPENSATORY, we are fully aware that the profession have been abundantly supplied with similar works of a high scientific character, which would leave no excuse for the publication of another, unless it should present important information not contained in the standard works.

It may not be known to some of the readers of this work, that a great amount of highly important knowledge, in reference to the Therapeutic value of remedies, and especially of our native-American plants, has been accumulated by liberal-minded physicians in America; which knowledge, owing to various causes, has never yet been sufficiently brought before the medical profession generally, and has not been embodied in the voluminous standard works of Pereira, Wood and Bache, Dunglison, etc. This knowledge being especially American in its origin, and having produced a marked peculiarity in the practice of a large number of American physicians, we deem it proper to style this work the "AMERICAN Eclectic Dispensatory," to distinguish it from other works, which contain only the ideas or views which are common to both American and European physicians.

Another urgent reason for the publication of this work, lies in the fact, that the important improvements and discoveries of American Eclectic physicians have not only been, to a great extent, overlooked by authors, but have already begun to find their way into medical works without any reference whatever to their paternity; and in some instances, articles familiarly known and used for twenty years past by Medical Reformers, have been gravely brought forward as new discoveries.

The use of the term ECLECTIC, in our title, implies something more than what we usually associate with that word as a common adjective. It refers to the existence of a large class of physicians in America, who believe that the profession has been too much trammelled by the influence of authority, and by the disposition to impose upon the young members of the profession, certain scientific and ethical doctrines which their seniors have sanctioned; thus reducing a noble profession, with a comprehensive science, to the character of a *sect*, with certain cherished *dogmas*. AMERICAN ECLECTICISM is thus opposed to medical SECTARIANISM, and especially to that most oppressive form of sectarianism, which, like the Roman Hierarchy, denying that it is *sectarian*, assumes to be an embodiment of unquestionable truth, and pronounces the medical system which may be sanctioned by the majority of the present generation, a standard of scientific truth, from which any deviation, or even the expression of dissent, should be condemned and punished by professional and even social ostracism.

This assumption of infallibility, in the existing and prevalent system of the therapeutics, or rather, of the right to enforce its acceptance, by dishonoring all who dissent from its doctrines, is too extravagant to bear the test of serious examination. No one who is familiar with medical history, who recollects the incessant changes in medical doctrines and practice from the days of Galen's infallibility to the present time, and who remembers how sternly the main body of the profession have rejected and condemned the doctrines which their successors were compelled to adopt, can suppose that a profession so very fallible in all past time, has even yet acquired infallibility; nor can any one seriously believe it, when he observes in the doctrines and practice of the present day the same slow, steady, progressive change as in past times. And if the idea of doctrinal infallibility as to Therapeutics, either in the mass of the profession or in its most gifted leaders, be, in fact, too absurd for serious argument, what possible foundation can there be for the assumption that truthfulness and professional respectability belong exclusively to the majority, and to their transitory doctrines, and that any different scientific doctrines should be branded as empirical and disreputable?

Such assumptions, being essentially absurd and groundless, are based now, as they always have been, on that arrogant and intolerant element of human nature, which leads all large masses of men to attempt to enforce conformity to their own sentiments, and to dishonor all that opposes them—as an Egyptian rabble hoot at a passing Christian. The liberal and humane spirit of the age is opposed to such intolerance, and demands that sectarians in theology and in science shall extend mutual toleration to each other.

This toleration is demanded not only by sound morals, by the spirit of humanity and the amenities of social life, but by justice to truth; for as no sect or doctrine can be based exclusively upon falsehood, and as it is certain that whatever has been received by any considerable number of men must contain an appreciable amount of truth, true philosophy dictates that we should receive and examine with candor all medical doctrines, not only through courtesy to their supporters, but for the sake of profiting by their truths. This duty is especially urgent when the supporters of such doctrines claim to have achieved much good by their medical practice; and if their claims are well-grounded, we should be culpable indeed, in neglecting to avail ourselves of the instruction which they proffer for the sake of humanity.

Those physicians who, in America, have been most zealous in maintaining these liberal principles, have been called *Eclectics*, and the principal school in which such doctrines have been taught has been called the "Eclectic Medical Institute." It is true, that many physicians have contended that the whole profession should be Eclectic, and that some even maintain that it is at present Eclectic, and liberally examines or adopts whatever may be presented that is new and true. It is true, that the profession is not *totally destitute* of the spirit of Eclecticism, for such destitution would imply a total destitution of liberality, but we cannot recognize Eclectic liberality in those who treat with bitter scorn the personal and professional characters of scientific physicians whose doctrines differ from the more prevalent views of therapeutics, and who, instead of recommending, endeavor to discourage or prevent the free examination of what they consider heretical doctrines, and who attach professional penalties to the avowal of what they deem heretical sentiments. If the

investigation of different medical doctrines is to be carried on under the threat of professional excommunication, unless certain conclusions are adopted, and if, as has been recently arranged in certain medical colleges, the young practitioner shall be entitled to hold his diploma only so long as he adheres to certain opinions, there is no more freedom of investigation conceded on medical subjects than there would be freedom of suffrage when the polls were overawed by the bayonets of one of the candidates.

In extending our personal courtesy and professional liberality to the followers of Hahnemann, Priessnitz, and minor leaders of medical parties, we are merely obeying the positive dictates of morality and religion, which forbid unkind, illiberal sentiments; and as the time must come when all that has been developed by the labors of medical sectarians shall be incorporated with the established mass of recognized science, it is unwise and injurious to the progress of the profession to delay such incorporation by encouraging animosities and isolation among the cultivators of medical science.

Such is the kindly and harmonious spirit which American Eclectics desire to see introduced into the profession; but in addition to these ethical improvements, they desire a more faithful and prompt adherence to the dictates of *Clinical experience*. There are many changes in the details of medical practice, the value of which has been amply demonstrated by experience, in the various climates of the United States, but which have not yet been adopted by the profession generally, because they are not yet sufficiently known and understood by those who have not been pupils of the Eclectic Medical Institute. For the nature of these improvements, and their gratifying results in the treatment of disease, we must refer to the "American Eclectic Practice, by Professors Jones and Morrow," the "Eclectic Practice of Medicine, by Professors Newton and Powell," as well as the "Lectures on the American Eclectic System of Surgery, by Professor Hill," and the forthcoming system of Eclectic Obstetrics, by the author of the present volume.

For further information of the Eclectic system, we would refer to the practice of Eclectic physicians, and to the Lectures of the Institute. This College, chartered in 1845, has been for some years the leading Medical College of the West, in point of numerical attendance; the whole number of matriculants in 1852-3, and 1853-4, was six hundred, and the whole number of graduates amounted to one hundred and thirty-three. We make this reference because the highest evidence of the value of Eclecticism is found in the successful treatment of disease by Eclectic physicians; in the treatment of 1503 cases of cholera in Cincinnati, in 1849, with a mortality of only 65, and many analogous facts, which will hereafter be more fully authenticated. These great practical improvements are simply the fruits of patient and faithful attention by numerous physicians to the results of experience, and the liberal spirit of the Faculty of the Institute, who have not disdained to gather knowledge from any source. We should not overlook, in our passing reference, the distinguished services of individuals who, if they were not like Hahnemann or Dixon, the authors of a special and exclusive theory of therapeutics, have the more exemplary merit of faithful scientific observation in a liberal and candid spirit of improvement, and the honor of arranging and presenting before the public, with untiring energy and unshrinking moral courage, a mass of science much in advance of prevalent ideas, and consequently greatly embarrassed by the habitual, resolute

opposition of conservative minds. We allude especially to DR. THOMAS V. MORROW, to whose reputation as a practitioner, and untiring zeal as a medical professor, we are mainly indebted for the establishment and maintenance of a school devoted to the Eclectic system of medicine at Worthington, Ohio, and the subsequent successful establishment of the Eclectic Medical Institute of Cincinnati. This reference to Professor Morrow is especially demanded by the fact that so little has been left from his pen to bear witness to the value of his services as a medical teacher and pioneer laborer in medical reform and improvement. His distinguished co-laborers, Professors J. R. BUCHANAN and I. G. JONES, have already, by their pens, made known to medical readers their conspicuous agency in medical progress.

We are greatly indebted to Professor BUCHANAN, the present Dean of the Institute, for his able and zealous services, especially since 1846, in maintaining the success, the reputation and unity of the Institute, and shaping its policy, while at the same time he has been known as a peculiarly original and philosophic teacher of medicine, and most distinguished exponent, before the public, of the philosophy of Eclecticism.

To Professor I. G. JONES, we are greatly indebted as an early co-laborer of Professor Morrow, at Worthington; as an eminent and veteran practitioner; an able teacher of medical practice, and a successful author, whose writings will contribute much to the diffusion and adoption of the improved system of therapeutics, the value of which has been so well displayed in his own practice. If the Eclectic improvements in medicine are even one half of what is believed by those who have personally tested them, they who have devoted their best energies and risked the entire loss of reputation for the sake of such truths, will be gratefully remembered by posterity, and the names of MORROW, BUCHANAN and JONES, with their coadjutors and successors in the labor of scientific reform, will be held in distinguished honor.

To this cause, the author of the present volume has been devoted for about twenty years as a medical practitioner, and latterly as a medical professor and author, and he wishes no higher honor than to be recognized as one of those who, at the commencement of the Eclectic movement, have participated in the labors of its pioneers.

An important characteristic of American Eclecticism, which may be illustrated by this volume, is the superior zeal displayed by Eclectic physicians in making important and much needed improvements in the *Materia Medica*, and especially in developing the medicinal value of our native plants. There are many results attainable in practice, by the use of these new resources, which could not be satisfactorily realized by the agents in ordinary use. One of these important results is the ability to dispense partially, if not wholly, with various unsafe or deleterious agents, and accomplish the purposes for which they are used by safer and more scientific treatment. We say more *scientific*, because that is certainly the most scientific prescription which accomplishes the object desired without incidentally inflicting unnecessary injury. The many inconveniences and dangers attending the use of mercurial medicines have produced a strong desire to find some safe and efficient substitute. There is no single remedy ever known to man which has produced a greater amount of mischief by its indiscriminate use than *Mercury*; nor is there any other drug which has done one-hundredth part as much to create a prejudice against

scientific medicine, to destroy the confidence of the community in its practitioners, and to repel them from the physician to the nostrum-dealer. But with the mass of the profession, the desire to find a substitute for Mercury has been rather an idle fancy than a positive desire or purpose, and has produced no result whatever. Indeed, the conviction still prevails, that no substitute for mercury can be found, and we regret to record the fact, in the year 1854, that medical schools and medical authors generally, still regard mercury as the only powerful and reliable cholagogue, simply because they are not acquainted with the powers of other agents; the most specific cholagogue known, Leptandrin, not having obtained a place in any but the Eclectic Dispensatory, and Leptandra itself having been excluded from the U. S. Pharmacopœia and the official part of the U. S. Dispensatory, on account of its supposed worthlessness. Leptandrin, Podophyllin, Apocynin, and Iridin, with Sanguinaria, Taraxacum, Berberis, and Euonymus, and occasional combinations of other articles, accomplish far more than Mercury performs, in the way of arousing the liver, affecting the secretions generally, and even producing salivation of a harmless character. It is not merely in substitutes for mercurials, and for various prescriptions which the physician uses with caution, and without entire satisfaction, that the improvement of the Eclectic Materia Medica consists, but also in the introduction of agents and powers of a novel character, or the extensive application of articles previously little known and seldom used. Of articles, previously little known or used by the profession, which are extensively used by Eclectic physicians, we may enumerate:

Achillea,	Cypripedium,	Leonurus,	Pteris,
Actæa,	Daucus,	Leptandra,	Pterospora,
Adiantum,	Diervilla,	Liatris,	Pycnanthemum,
Aletris,	Dioscorea,	Ligustrum,	Pyrola,
Alnus,	Epigæa,	Liquidambar,	Rhus,
Althea,	Erechthites,	Liriodendron,	Robinia,
Amaranthus,	Erigeron,	Lobelia,	Rubus,
Ampelopsis,	Eryngium,	Lycopus,	Rudbeckia,
Apocynum,	Erythronium,	Lythrum,	Rumex,
Aralia's,	Euonymus,	Marrubium,	Sabbatia,
Arum,	Eupatorium,	Menispermum,	Salix,
Asarum,	Euphorbia,	Menyanthes,	Sanicula,
Asclepias,	Frasera,	Mitchella,	Saponaria,
Aster,	Fraxinus,	Monotropa,	Scutellaria,
Baptisia,	Galium,	Myrica,	Senecio,
Berberis,	Gelseminum,	Nymphæa,	Silphium,
Betula,	Geranium,	Onosmodium,	Solidago,
Bidens,	Gerardia,	Orobanche,	Spiræa,
Buxus,	Geum,	Osmunda,	Spirit Vapor Bath,
Capsicum,	Gillenia,	Ostrya,	Stillingia,
Caulophyllum,	Hamamelis,	Pæonia,	Symphytum,
Ceanothus,	Helianthemum,	Panax,	Trifolium,
Celastrus,	Helonias,	Parthenium,	Trillium,
Chelidonium,	Heracleum,	Phytolacca,	Ulmus,
Chelone,	Heuchera,	Plantago,	Urtica,
Chimaphila,	Hieracium,	Podophyllum,	Uvaria,
Cimicifuga,	Hydrastis,	Polemonium,	Uvularia,
Clematis,	Hypericum,	Polypodium,	Verbascum,
Cochlearia,	Inula,	Polytrichum,	Verbena,
Comptonia,	Iris,	Populus,	Vernonia,
Convallaria,	Jeffersonia,	Prinos,	Viburnum,
Corydallis,	Kalmia,	Ptelea,	Xanthoxylum.

Together with numerous others not herein referred to.

It is true, that a number of the foregoing articles have been referred to by medical writers, and a few have been occasionally used in practice, but in general, they have been located at the extreme verge of the visible horizon of the profession—in the outside regions of empiricism unknown to the mass of physicians, and but slightly known to any who were not especially addicted to botanical pursuits. The honor of their introduction into regular medical practice, belongs to the Medical Reformers of America, through whom their virtues have been made known; and by whom articles have been made prominent and important agents in the *Materia Medica*, which were previously treated with so much contempt, that a physician felt almost ashamed to investigate their virtues, or acknowledge any acquaintance with them.

Of the above articles, or their concentrated principles, which are absolutely new, and at present confined to the circle of practice of Medical Reformers, by whom they were introduced, we may mention:

Aletridin,	Diervilla,	Hydrastin,	Pteris Atrop.,
Alnuine,	Dioscorea,	Iridin,	Pterospora,
Ampelopsis,	Dioscorein,	Jeffersonia,	Pycnanthemum,
Antennaria,	Echinosperrum,	Juglandin,	Rhusine,
Apocynin,	Epigæa,	Leptandrin,	Robinia,
Asclepias Incar.	Equisetum,	Lobelia, oil of,	Rudbeckia,
Asclepidin,	Erechthites,	Menispermæ,	Scutellarin,
Aster,	Erechthites, oil of,	Mitchella,	Senecin,
Baptisin,	Euonymus,	Monotropa,	Sesquicarbonate of potassa
Bidens,	Euonymine,	Myricin,	Silphium,
Buxus,	Eupatorin,	Onosmodium,	Spirit vapor bath,
Caulophyllum,	Eupatorium Purp.,	Osmunda,	Staphylea,
Caulophyllin,	Eupurpurin,	Ostrya,	Stellaria,
Ceanothus,	Gallum,	Parthenium,	Stillinga, oil of,
Ceanothine,	Gelseminum,	Phytolaccin,	Uvaria,
Chelone,	Geranlin,	Podophyllin,	Uvularia,
Cimicifugin,	Gerardia,	Polemonium,	Vernonia,
Cornu cervinæ calcinatum	Goodyera,	Polytrichum,	Viburnum,
Corydalis,	Helonine,	Prunin,	Viburnine,
Corydalis,	Hieracium,	Ptelea,	Xanthoxylin, and oil of
Cypripedin,	Hierochloa,	Ptelein,	Xanthoxylum, etc.

The extensive use of the foregoing articles, and their consequent substitution, on many occasions, for the favorite remedies formerly in use, constitutes a practical improvement, the value of which can scarcely be estimated, and the simplest statement of what we believe and know to be true, as regards the superior success in practice resulting from these improvements in the *Materia Medica*, would be regarded, by those entirely unacquainted with the facts, as the language of extravagant enthusiasm. For their truth, however, we can but appeal to the final tribunal, *universal experience*; and it is partly with the view of facilitating this appeal by candid physicians, that this volume is laid before the public, in which, we trust, every medical reader will find sufficient information, in reference to the favorite remedies of Eclectic physicians, to enable him to enjoy in practice what we deem the richest fruits of modern clinical experience, constituting the most recent and important practical improvements in the healing art.

It will be seen that the work is divided into three parts:

Part I, is devoted to an explanation of the Natural Orders of the various Medicinal Plants named in the work, and which will prove a valuable reference for the practitioner in collecting them; indeed, without this reference, the

work would have been very imperfect, especially for those who practice as Medical Reformers.

Part II, is devoted to the *Materia Medica*; the various plants are arranged alphabetically, and their Botanical characters are given with sufficient accuracy to enable the medical botanist to select and determine them when met with. The Natural and Artificial classifications of each are mentioned, together with the Vulgar names by which they are known in different sections of our country. A brief reference is likewise made to their general History, with a statement of such Chemical relations and incompatibilities, medically considered, as will be necessary for practical purposes; and as far as known, the Therapeutic influence of each agent is fully but concisely presented. Since the introduction of our new remedies, some of which were discovered and introduced to the profession by the author, as Podophyllin,* Iridin, Cimicifugin, etc., a great improvement has taken place in Eclectic treatment, and the successful results have been so well marked and undisputed as to have recently invited the investigation of the more liberal old school physicians; and it is with no little pleasure we state, that already hundreds of them, notwithstanding arbitrary prejudices, are adopting our new remedies, and are gratified by finding them greatly superior to the agents for which they have been substituted.

Part III, is occupied principally with Eclectic Pharmacy, and those Preparations only have been described, which an enlarged and successful experience has justly entitled to the rank of officinal; many others might have been mentioned, but further investigations are required to test their permanent utility. Indeed, the Pharmacy of Eclectic Practice may be said to be almost endless, as a vast amount of agents, both simple and compound, are in constant use, which would require a volume equal in size to the present for their thorough consideration; and to select from these the more common and successful preparations has been a task of no ordinary labor. Our Resinoids, Oleo-resins, etc., which some might deem to be in their proper place only in this part of the work, we preferred to arrange in Part II, accompanying the history, etc., of the plants from which they are obtained. Decoctions and Infusions which are largely used in practice, have been briefly noticed, without any special list, although the general rules for their preparation are laid down; and wherever there is a departure from these in any article required in infusion or decoction, it will be ascertained under the description of the article in Part II.

* Many of our most valuable therapeutical agents have from time to time found their way into the Old School text-books without due credit having been given to their origin, thus leading many to believe that these agents were discovered and introduced to the profession by Old School physicians; when in truth they were merely transferred from the various reformed publications, to the pages of these text-books at different periods, as Reformers made them known. Our Podophyllin, since its value and usefulness have been demonstrated, is about to have the same course pursued with it, as various means are being adopted to bring the credit of its origin into the Old School ranks. In the new edition of Griffith's Universal Formulary, edited by Dr. Robt. P. Thomas, J. R. Lewis' method of preparing this resinoid, (a method adopted long after its discovery by the author,) is given, in which it is presented, by imputation, as a pure article; for the editor remarks—"An impure podophyllin has been prepared by W. S. Merrell, by precipitating the resin from a concentrated alcoholic tincture by the addition of water." But unfortunately for the purity and medicinal activity of Lewis' Podophyllin, it requires six grains to act as an ordinary cathartic, while that of Merrell's requires only from half a grain to a grain and a half, thus proving the latter to contain three or four times as much of the medicinal activity of the root as the former. The medical reader will, therefore, please bear in mind the difference between Eclectic Podophyllin, and that claimed by the Old School, as well as the difference in their modes of preparation.

In the Appendix will be found an amount of selected matter of a valuable character, consisting of Medical Abbreviations and Latin terms; Tables of Weights and Measures; of Mineral Waters; Specific Gravities; Solubility of Salts, etc., which will be of much utility to the chemist and pharmacist, and which, we hope, will prove acceptable to all.

The Index has been rendered as full and complete as possible, that no difficulty may be experienced in readily finding any subject contained in the work.

In scientific matters, to write a purely original work is out of the question; authors have to avail themselves of the information and discoveries promulgated by each other, and in the endeavor to present a complete practical knowledge of medicines, we have not hesitated to consult many excellent authorities; and though considerable information is introduced not to be had in other publications, yet the only originality claimed is the introduction of New Medicinal Plants; of Concentrated Remedies—their Preparations and uses; of valuable and Official Eclectic Pharmaceutic Preparations; the selection and disposition of the matter, and the endeavor to systematically methodize the hitherto crude material floating among Eclectics, as well as to rectify the irregular classification of many valuable remedies, thus preserving for Eclecticism the proper credit for all to which it is justly entitled. And as American Eclecticism has heretofore, by silence, lost much of the credit to which it was justly entitled,—it is hoped that this work, by a systematic presentation of its ample and original resources, may serve to secure the honor of medical improvements to their true sources.

We acknowledge our indebtedness to the following authorities, which have been freely consulted and selected from, viz: United States Pharmacopœia, United States Dispensatory, Christison's *Materia Medica*, Griffith's *Medical Botany*, Edwards' and Vavasour's *Materia Medica*, Mitchell's *Therapeutics*, Dunglison's *New Remedies*, Barton's *Collections*, Eberle's *Practice*, Thatcher's *Practice*, London, Edinburgh, and Dublin *Philosophical Magazine*, Southern *Journal of Medicine and Pharmacy*, Silliman's *Journal*, Boston *Medical and Surgical Journal*, Dublin *Journal of Medical Science*, Brande's *Manual of Pharmacy*, Dublin *Pharmacopœia*, London *Dispensatory*, Gray's *Botany of the Northern United States*, Mohr and Redwood's *Pharmacy by Procter*, *Journal de Pharmacie*, *Philosophical Magazine*, Pereira's *Materia Medica*, *Medical Examiner*, *Chemical Gazette*, Wood's *Class-Book of Botany*, Woodville's *Medical Botany*, Bigelow's *Vegetable Materia Medica*, *American Journal of Pharmacy*, *American Journal of Medical Sciences*, Braithwaite's *Retrospect*, London *Lancet*, Eaton's *Botany*, Lindley's *Medical Flora and Vegetable Kingdom*, Merat and De Len's *Dictionnaire de Matière Médicale*, Rafinesque's *Medical Flora*, Smith's *Botanic Physician*, Howard's *Botanic Practice*, Western *Medical Reformer*, *Eclectic Medical Journal*, Jones and Morrow's *American Eclectic Practice*, Newton and Powell's *Eclectic Practice*, Hill's *Eclectic Surgery*, etc., etc.

We are likewise under many obligations to Mr. W. S. Merrell, and Drs. F. D. Hill & Co., of Cincinnati, for several pharmaceutical communications of a valuable character, also to Professor J. Milton Sanders for the formula of several new salts, recently discovered by him, and some of which have been successfully employed as remedial agents. We likewise return our thanks to those members of the profession who have imparted to us new and useful medical information, or who have in any way contributed to aid us in the preparation of the work.

THE
AMERICAN
ECLECTIC DISPENSATORY

PART I.

DESCRIPTION
OF THE
NATURAL ORDERS
OF
MEDICINAL PLANTS.

THE study of Botany is an important part of the Physician's education, especially as we are daily becoming more and more indebted to the Vegetable Kingdom for our most valuable resources. In order, therefore, to invite attention to the science of Botany, as well as to assist the practitioner in the Botanical investigation of the various Medicinal Plants referred to in the body of this work, a departure from the usual course pursued in the preparation of Dispensatories has been taken, and as full a description of their NATURAL ORDERS, as could be obtained from the various authors consulted, given in the following pages. These, together with the individual characters related under the head of each article of the *Materia Medica*, Part II, will enable the Practitioner to select with accuracy, our various indigenous Medicinal Plants, from those not yet recognized as such. This will, undoubtedly, be viewed as a most important acquisition to the work, one which must materially enhance its value, in a practical sense, when it is remembered, that for want of a reference of this kind, many efficacious Remedial Plants, have remained unnoticed, or been entirely forgotten.

Botanists have divided the Vegetable Kingdom into two great natural divisions, viz; 1. PHENOGAMOUS or *Flowering Plants*, which are also called VASCULARES, from their abounding with ligneous and vascular tissue; 2. CRYPTOGAMIA or *Flowerless Plants*, also called CELLULARES from consisting chiefly of cellular tissue. These have again been divided into Orders, Classes, Genus, Species, etc., to enter into a detail of which is out of the province of this work.

PHÆNOGAMIA,

Or Flowering Plants.

Are plants consisting of a regular axis of growth, with leafy appendages; composed of a cellular, vascular, and ligneous structure; developing flowers and producing seeds.

SUBDIVISION I.

EXOGENS, OR, DICOTYLEDONOUS PLANTS.

Stems with a distinct pith and bark, between which are layers of woody fiber and vessels. *Growth* by annual, concentric, external zones or layers, and traversed by rays, *Leaves* mostly with reticulated veins, and falling off by an articulation. *Sepals* and *Petals* in fives and fours, much oftener than in threes. *Seeds* in a pericarp. *Embryo* with two or more opposite cotyledons.

CLASS I. ANGIOSPERMS.

Ovules produced within an *ovary* and fertilized by the pollen through the medium of the *pistil*, becoming *seeds* inclosed in a *pericarp*. *Cotyledons*, only two, opposite.

SUB-CLASS I. POLYPETALOUS PLANTS.

Floral envelopes usually consisting of both calyx and corolla; the latter composed of distinct petals, (occasionally absent.)

ORDER I. RANUNCULACEÆ. CROWFOOTS.

Herbs, (or woody vines) with a colorless acrid juice. *Leaves* mostly alternate and much divided, with half-clasping petioles. *Calyx* of mostly five sepals, sometimes three, four, or six, mostly deciduous, and imbricated in æstivation. *Corolla* with from three to fifteen petals, sometimes irregular, or wanting. *Stamens* many, distinct, hypogynous. *Anthers* adnate or innate. *Ovaries* many, occasionally few or solitary, distinct, seated on the torus. *Fruit* either dry achenia, or baccate, or follicular. *Embryo* minute, at the base of horny or fleshy albumen.

1. CLEMATIS. *Sepals* four, colored, pubescent, the valvate margins more or less bent inwards in the bud. *Petals* none, or shorter than the sepals. *Filaments* numerous, shorter than the sepals. *Anthers* linear, extrorse. *Ovaries* from four to twenty. *Styles* longer than the stamens. *Achenia* numerous in a head, bearing the persistent styles mostly as hairy or plumose tails.—Perennial herbs or vines, a little woody, with opposite and mostly compound leaves.

2. ANEMONE. *Involucre* of three divided leaves, distant from the flower, its leaflets incised. *Calyx* regular, of five to fifteen colored sepals, petaloid. *Corolla* none. *Stamens* numerous, much shorter than the sepals. *Ovaries* many, free, collected into a roundish or oval head. *Achenia* many, mucronate or caudate.—Perennials with radical leaves, and scapes with leaf-like involucre.

3. HEPATICA. *Involucre* of three entire, ovate, obtuse bracts, calyciform, very near the flower, persistent. *Calyx* of five to nine petaloid sepals, disposed in two or three rows. *Corolla* none. *Stamina* many, short. *Achenia* awnless.—Leaves all radical, thick, and persistent; flowers single.

4. RANUNCULUS. *Sepals* five. *Petals* five, occasionally ten, with a nectariferous scale or pore at the base inside. *Stamens* and *ovaries* numerous. *Achenia* numerous in a head, ovate, flattened, pointed. *Seed* erect.—Annuals or perennials, with alternate stem-leaves, and flowers solitary or somewhat corymbed, yellow, rarely white.

5. COPTIS. *Sepals* five or six, oblong, concave, colored, deciduous. *Petals* five or six, small, cucullate, obconic. *Stamens* twenty to twenty-five, hypogynous. *Pistils* from three to seven, on slender stalks. *Capsules*, many, stipitate, rostrate, diverging in a stellate manner, and from four to six seeded.—Low smooth perennials, with ternately divided root-leaves, a long, slender, creeping rhizoma, and small white flowers on scapes.

6. HELLEBORUS. *Sepals* five, petaloid, greenish, rounded, persistent. *Petals*, from eight to ten, very short, tubular, two-lipped. *Stamens* numerous. *Stigmas* from three to ten, orbicular, terminal. *Follicles* coriaceous, many-seeded, nearly erect. *Seeds* arranged in two rows, elliptical, umbilicated.—Perennials with divided, coriaceous leaves, and large nodding flowers.

7. DELPHINIUM. *Sepals* five, colored, the upper one spurred, deciduous. *Petals* four, irregular, the two upper ones terminating behind in a tubular, nectariferous spur, inclosed in the spur of the calyx. *Styles* one to five, mostly three. *Follicles* one to five, many-seeded.—Plants with leaves much divided, flowers in terminal racemes, blue, red or purple, never yellow.

8. ACONITUM. *Sepals* five, very irregular, petaloid, deciduous, the upper one helmet-shaped, larger than the others. *Petals* five, the three lower very minute or wanting, the upper two on long claws, concealed beneath the helmet-shaped sepal, recurved, and nectariferous at the

apex.—Perennials, with digitate or palmate leaves, and flowers in terminal spikes.

9. *ACTÆA*. *Sepals* four, roundish, deciduous. *Petals* four to eight, spatulate, unguiculate. *Stamens* numerous, dilated above. *Anthers* two lobed, introrse. *Stigma* sessile, depressed, two-lobed. *Ovary* ovoid. *Fruit* globose, with a lateral furrow, one-celled. *Seeds* many, smooth, compressed, horizontal.—Perennials with ternately divided leaves, and a thick terminal raceme of white flowers.

10. *CIMICIFUGA*. *Sepals* four or five, deciduous. *Petals* three to five, concave or unguiculate, sometimes wanting. *Stamens* many. *Anthers* introrse. *Style* short. *Stigma* simple. *Follicles*, one to eight, oblong, many-seeded.—Perennials with ternately divided leaves, the leaflets cut-serrate, and white fetid flowers in long slender racemes.

11. *XANTHORIZA*. *Sepals* five, regular, spreading, deciduous. *Petals* five, much smaller than the sepals, concave, two-lobed, and raised on a claw. *Stamens* five or ten. *Pistils* and *ovaries* five or ten. *Ovaries* beaked with the styles, two or three ovuled. *Follicles* oblong, mostly one-seeded. *Seed* suspended.—Low suffruticose plants; stem and bark yellow and bitter; leaves pinnately divided; flowers small, dark purple, often polygamous, in axillary, compound, drooping racemes.

12. *HYDRASTIS*. *Sepals* three, ovate, petaloid, equal, falling away when the flower opens. *Petals* none. *Stamens* and *ovaries* numerous. *Anthers* innate. *Pistils* many, two-ovuled. *Stigma* flat, two-lipped. *Fruit* baccate, compound, terminated by a style, one celled, one or two seeded. *Seeds* obovate, polished.—Perennials with two leaves, and one flower.

13. *PÆONIA*. *Sepals* five, unequal, leafy, persistent. *Petals*, five to ten, roundish. *Stamens* many, mostly changed to petals by cultivation. *Ovaries* from two to five, surrounded by the fleshy disk. *Style* none. *Stigmas* double, persistent, sessile. *Follicles* fleshy, many-seeded. *Seeds* dry, round, numerous.—Perennials with fasciculate roots, biternate leaves, and large, terminal, solitary flowers.

ORDER II. MAGNOLIACEÆ. MAGNOLIADS.

Trees or shrubs, with alternate, coriaceous, simple, entire or lobed, never serrate, minutely punctate leaves, and deciduous, membranaceous stipules, either convolute in the leaf-bud, or placed face to face. The flowers are large, solitary, showy, perfect, and fragrant. The calyx is deciduous, of three to six sepals, and colored like the petals; the corolla consists of from three to thirty petals in several rows. *Stamens* numerous, hypogynous, distinct, with short filaments, and adnate anthers.

Ovaries several, in many rows upon an elongated torus; *style* short, with a simple stigma. *Fruit* various, of numerous one or two-seeded follicular or baccate carpels, woody or fleshy, and aggregated in a cone-like form. *Seeds* anatropous, suspended or ascending, with a fleshy albumen containing a small embryo at base.

1. *MAGNOLIA*. *Calyx* with five sepals, often none or petaloid. *Petals* six to twelve, caducous. *Stamens* with very short filaments, and long anthers opening inward. *Pistils* aggregated and coherent in a mass, together forming a fleshy and rather woody cone-like fruit; each carpel opening on the back at maturity, from which the one or two berry-like seeds hang by an extensile stalk composed of a fine web of unrolled spiral vessels. *Inner seed coat bony*.—Mostly trees with luxuriant foliage and large fragrant flowers; buds conical, formed of the successive pairs of stipules rolled up, each pair enveloping the leaf next above, which is folded lengthwise, and applied straight against the side of the next stipular sheath, and so on.

2. *LIRIODENDRON*. *Sepals* three, reflexed, caducous. *Petals* six, spreading, in two rows, making a bell-shaped corolla. *Anthers* linear, opening outward. *Pistils* flat and scale-form, long and narrow, imbricated and cohering together in an oblong cone, dry, separating from each other, and from the prolonged slender axis in the fruit, and falling away whole, like a samara or key, indehiscent, one or two-seeded in the small cavity at the base. *Buds* flattish, sheathed by the successive pairs of flat stipules joined at their edges, the folded leaves bent down on the petiole so that their apex points to the base of the bud.—Trees with large and fragrant flowers.

3. *DRIMYS*. *Calyx* two or three-cleft, or with two or three deep divisions. *Corolla* with two or three petals, sometimes more. *Stamens* numerous, with the filaments thickened at the summit, and *anthers* having two cells. *Ovaries* four to eight. *Carpels* congested, baccate, many seeded.

ORDER III. ANONACEÆ. CUSTARD APPLES.

Trees or shrubs, with alternate, simple, entire *leaves*, no *stipules*, naked *buds*, and *flowers* usually green or brown, axillary, large, shorter than the leaves. The *sepals* are three or four, persistent, often united at base. *Petals* six, in two rows, coriaceous, hypogynous, æstivation valvate. *Stamens* numerous, densely crowded, with extrorse adnate *anthers*. *Filaments* very short. *Pistils* several or many, separate or cohering in a mass. *Style* short or none. *Stigma* simple. *Fruit* dry or succulent, from one to many seeded, distinct, or aggregated. *Seeds*

anatropous, large, with a crustaceous seed-coat, and a minute embryo at the base of the ruminated albumen.

1. *UVARIA*. *Sepals* three, united at base. *Petals* six, in two rows, their margins in each set slightly overlapping in the bud; the outer set larger. *Stamens* numerous in a globular mass. *Pistils* few. *Fruit* oblong, baccate, often torulose, pulpy within. *Seeds* several.—Shrubs or small trees, of an unpleasant odor when bruised; flowers dull-colored, axillary and solitary.

ORDER. IV. MENISPERMACEÆ. MOONSEED.

Twining or climbing shrubs, with alternate, entire *leaves*, and small *flowers* in panicles or racemes, usually diœcious. *Sepals* from three to eight, in a double series, from two to four in each, imbricated in æstivation, hypogynous, deciduous. *Petals* from one to eight, hypogynous, usually as many as the sepals. *Stamens* distinct or monadelphous, equal in number to the petals, and opposite to them, or three or four times as many. *Anthers* innate, and consisting of four globose lobes. *Fruit* a one-seeded drupe, with a large curved embryo. *Albumen* sparing.

1. *COCCULUS*. *Flowers* unisexual, diœcious. *Sepals* six, in two rows. *Petals* six, distinct. *Stamens* six, opposite, free. *Ovaries* from three to six. *Drupe*s one to six, one-celled, one-seeded. *Racemes* axillary, rarely lateral.—Flexible or twining plants.

2. *MENISPERMUM*. *Sepals* four to eight, in a double row. *Petals* four to seven, minute, retuse. *Flowers* diœcious. *Stamens* twelve to twenty. *Anthers* four-celled. *Ovaries* and *styles* two to four. *Drupe*s round, one-seeded. *Seeds* lunate and compressed.—Twining or climbing plants.

3. *ANAMIRTA*. *Flowers* diœcious. *Sepals* six, in a double series, with two closely-pressed bracteoles. *Stamens* united. *Columns* dilated at the apex. *Anthers* numerous, covering the whole globose apex of the column. *Female flowers* unknown. *Drupe*s one to three, one-celled, one-seeded. *Seed* globose, deeply excavated at the hilum. *Albumen* fleshy; *cotyledons* very thin, diverging.—Twining plants with a corky bark, leaves more or less cordate-ovate, and flowers in lateral compound racemes.

4. *CISSAMPELOS*. *Flowers* diœcious. *Male flowers*, with four *sepals* in a double series. *Petals* four, united into a cup-shaped corolla. *Stamens* five; *anthers* connate. *Fertile flowers*, with one, rounded *sepal*, and one *petal*. *Fruit* a one-seeded berry.

ORDER V. MYRISTICACEÆ. NUTMEG.

Trees with alternate, exstipulate, not dotted, entire, petiolate, coriaceous leaves. Flowers in axillary or terminal racemes or panicles, very small, often each with one short, cucullate bract. *Calyx* coriaceous, usually tomentose outside, trifold or rarely quadrifold, with a valvate æstivation. Unisexual; *male flowers* with the filaments separate or united in a cylinder. *Anthers* from three to twelve or more, extrorse, with a longitudinal dehiscence, connate or distinct. *Female flowers*, with a deciduous *calyx*; *carpels* solitary or many, with a single erect anatropal ovule; *style* very short; *stigma* somewhat lobed. *Fruit* baccate; *albumen* ruminant, between fleshy and fatty; *embryo* small; *cotyledons* diverging. *Radicle* inferior.

1. MYRISTICA. *Flowers* diœcious. *Calyx* urceolate, three-toothed. Male, *stamens* united into a columnar tube; *anthers* from six to ten, cohering. Female, *ovary* simple; *style* none; *stigma* two-lobed. *Pericarp* fleshy, two-valved, one-seeded. *Seed* inclosed in a coriaceous, many-cleft arillus.—Aromatic and stimulant trees.

ORDER VI. BERBERIDACEÆ. BARBERRY.

Herbs or shrubs with alternate, usually exstipulate, simple or compound leaves. Flowers solitary, racemose, or panicled, perfect. *Calyx* of three to six sepals, imbricate in two rows, often reinforced by petaloid scales, deciduous. *Corolla* hypogynous, with one to three times as many petals as sepals, and opposite to them. *Stamens* as many or twice as many as the petals and opposite to them. *Filaments* short. *Anthers* generally opening by recurved valves, adnate, extrorse. *Ovary* one-celled, solitary, simple. *Style* sometimes lateral or oblique, sometimes wanting. *Stigma* orbicular or peltate. *Fruit* baccate or capsular. *Seeds* one or few, attached to the bottom of the cell; or many, attached to lateral placentæ. *Embryo* in the axis or near the base of the fleshy or horny albumen.

1. BERBERIS. *Sepals* six, obovate, spreading, colored, with two or three bractlets outside. *Petals* six, suborbicular, biglandular at base. *Stamens* six, without denticulations, and with flattened filaments. *Anthers* two separate lobes on opposite edges of the connectile. *Stigma* orbicular, nearly sessile. *Fruit* a fleshy, one-celled berry, oblong, two or three-seeded. *Seeds* erect, oblong, with a crustaceous integument.—Shrubs, with yellow wood and inner bark, yellow flowers in drooping racemes, and sour berries and leaves; *stamens* irritable.

2. LEONTICE. (CAULOPHYLLUM.) *Calyx* free from the ovary, and consists of from three to six green sepals, with two, three or more fugacious bractlets at base, ovate-oblong. *Petals* six, gland-like, somewhat kidney-shaped or hooded bodies with short claws, much smaller than the sepals, one at the base of each of them. *Stamens* six, opposite the petals; *anthers* oblong; the face of each cell opening like a lid or valve, hinged at the top. *Pistil* gibbous; *style* short; *stigma* minute; *ovary* bursting at an early stage by the pressure of the two erect enlarging seeds, soon withering away. *Pericarp* membranaceous, caducous, two to four-seeded. *Seeds* erect, globose, naked on their thick seed-stalks, looking like drupes; the fleshy integument blue; the solid albumen horny.

3. PODOPHYLLUM. *Sepals* three, oval, obtuse, concave, deciduous. *Petals* six to nine, obovate, concave. *Stamens* six to eighteen, with linear *anthers*, not opening by perfect uplifted valves. *Ovary* ovoid; *stigma* large. *Fruit* a large fleshy berry, ovoid, one-celled, many-seeded, crowned by the solitary, crenated, sessile stigma. *Seeds* covering the thick lateral placenta, inclosed in pulpy arils, all forming a mass which fills the cavity of the fruit.—Perennials with creeping rootstocks and thick fibrous roots, acrid and purgative; stems two-leaved, one-flowered.

4. JEFFERSONIA. *Sepals* four, colored, deciduous. *Petals* eight, oblong, flat, spreading, incurved. *Stamens* eight, with oblong-linear anthers, on slender filaments. *Ovary* ovoid, soon gibbous, pointed; *stigma* two-lobed, peltate. *Capsule* obovate, stipitate, opening half-way round horizontally, making a lid. *Seeds* many on the lateral placenta, with a fleshy lacerate aril on one side.—Perennial glabrous herbs, with matted fibrous roots, long-petioled root-leaves, bearing two half-ovate leaflets, and simple naked one-flowered scapes.

ORDER VI. NYMPHACEÆ. WATER-LILY.

Aquatic herbs, with peltate or cordate floating leaves from a prostrate rhizoma. The *flowers* are large, showy, solitary, often sweet-scented. *Sepals* and *petals* numerous, imbricated, gradually passing into each other; sepals persistent; petals inserted upon the disk which surrounds the pistil. *Stamens* numerous, in several rows upon the disk, with petaloid filaments, and adnate, introrse anthers. *Fruit* a pod-like berry ripening under water, crowned with the radiate stigmas, many-celled, many-seeded; seeds anatropous, attached to the spongy placenta, and enveloped in a gelatinous aril; embryo small, inclosed in a little bag at the end of the farinaceous albumen, next the hilum, with a distinct plumule, inclosed by the two cotyledons.

1. *NYMPHÆA*. *Sepals* four, arising from the side of the ovary, green outside. *Petals* numerous in many rows, perigynous, the inner narrower and gradually passing into numerous perigynous stamens. *Fruit* a depressed-globular pericarp, dry, indehiscent, many-celled, with a sessile, linear, separate, peltate stigma surrounded with rays; covered over by the withered sepals and petals; a papilla in the center of the stigma. *Seeds* numerous, inclosed in a sac-like aril.—Perennial aquatic plants, with white, blue or rose-colored flowers.

2. *NUPHAR*. *Sepals* five or six, oblong, concave, colored within, petaloid, hypogynous, permanent. *Petals*, ten to eighteen, hypogynous, much smaller than the sepals and stamen-like, furrowed externally, inserted with the stamens on the torus, and secreting honey from their back. *Stamens* numerous, truncated, linear, springing with elasticity from the ovary about the time of flowering. *Fruit* a dry, indehiscent, many-celled, many-seeded pericarp, ovoid, naked, and crowned by a stellate, peltate, sessile, compound stigma; aril none.—Perennial, aquatic plants with yellow flowers; the root in infusion with milk said to kill cockroaches; also reputed anti-aphrodisiac.

ORDER VII. SARRACENIACEÆ. WATER PITCHERS.

Perennial bog-plants with fibrous roots, and hollow pitcher-form, or trumpet-shaped radical leaves. The flowers are large, solitary, or several on scapes. *Sepals* five, persistent, with a three-leaved involucre at base; aestivation imbricate. *Petals* five, unguiculate, hypogynous, concave. *Stamens* numerous, hypogynous, with oblong, adnate, introrse anthers. *Ovaries* five-celled, placentæ central. *Style* single, petaloid, umbrella-shaped. *Stigma* dilated, peltate, five-angled. *Fruit* capsular, five-celled, five-valved, crowned with the persistent stigma. *Seeds* numerous, minute.

1. *SARRACENIA*. *Sepals* five, with three small bracts at base, colored, persistent. *Petals* five, oblong or obovate, incurved, deciduous. *Stamens* numerous, hypogynous. *Ovary* compound, globose, crowned with a short style, which is expanded at the summit into a very broad and petal-like five-angled and five-rayed umbrella-shaped body; the five delicate rays terminating under the angles in as many little hooked stigmas. *Capsule* with a granular surface, protected by the persistent style, five-celled, with many-seeded placentæ in the axis, five-valved. *Seeds* anatropous, with a small embryo at the base of fleshy albumen.—Perennials, yellowish-green and purplish; the hollow leaves having a wing on one side, and a rounded, arching hood at the apex.

ORDER VIII. PAPAVERACEÆ. POPPY.

Herbaceous plants, with milky or colored juice, and alternate simple or divided leaves, without stipules. The flowers are solitary, on long

peduncles, never blue. *Sepals* two, rarely three, deciduous, imbricated in aestivation. *Petals* four to twelve, hypogynous, spreading, imbricated in the bud, deciduous. *Stamens* distinct, numerous, but some multiple of four, rarely polyadelphous, with innate *anthers*. *Ovary* of one or more united carpels; *style* very short or none; *stigmas* two, or if more, stellate upon the flat apex of the ovary. *Fruit* either pod-shaped, with two parietal placentæ, or a one-celled capsule, opening by valves, holes, or pores under the permanent stigma. *Seeds* numerous, anatropous, minute, often crested with a minute embryo at the base of fleshy or oily albumen.

1. PAPAVER. *Sepals* two, convex, deciduous. *Petals* four. *Stamens* numerous. *Style* wanting; *stigmas* united in a flat four to twenty radiate crown resting on the summit of the ovary and capsule. *Capsule* superior, short, turgid, spheroidal, one-celled, with many-seeded placentæ, forming incomplete septa, opening by many pores beneath the lobes of the broad, persistent stigma.—Exotic herbs, mostly biennial, with white juice, and nodding flower-buds.

2. SANGUINARIA. *Sepals* two, caducous. *Petals* eight to twelve, spatulate-oblong, the inner narrower. *Stamens* twenty-four. *Style* short. *Stigmas* two, sessile, one or two-lobed, connate. *Capsule* pod-like, oblong, acute at each end, one-celled, two-valved, many-seeded. *Seeds* obovate, with a large crest.—Perennials, with thick prostrate root-stocks containing a red-orange acrid juice, with white flowers.

3. CHELIDONIUM. *Sepals* two, suborbicular. *Petals* four, suborbicular, contracted at base. *Stamens* numerous, shorter than the petals. *Style* nearly wanting. *Stigmas* small, sessile, two-lobed. *Capsule* siliqua-form, linear, slender, smooth, two-valved, one-celled, the valves opening from the bottom. *Seeds* numerous, with a glandular cristate raphe.—Perennials, with brittle stems, saffron-colored acrid juice, and small yellow flowers in umbel-like clusters.

ORDER IX. FUMARIACEÆ. FUMITORY.

Herbaceous plants with brittle stems and a watery juice. *Leaves* usually alternate, multifid, often furnished with tendrils. *Flowers* irregular, purple, white, or yellow. *Sepals* two, small and scale-like, deciduous. *Petals* four, hypogynous, parallel, one or both of the outer saccate, two inner cohering at apex. *Stamens* six, diadelphous, with dilated *filaments*, and adnate, extrorse *anthers*, the two outer one-celled, middle one two-celled. *Ovary* superior, one-celled; *ovules* horizontal, amphitropal; *style* filiform; *stigma* with one or more points, flattened at right angles with the ovary. *Fruit* either an indehiscent, one or two-seeded

nut, or a two-valved, or succulent indehiscent, polyspermous pod. *Seeds* horizontal, shining, arilled. *Albumen* fleshy. *Embryo* minute, out of the axis; straight where the fruit is indehiscent, and somewhat curved where it dehisces.

1. *DIELYTRA*. (*Corydallis Formosa*.) *Sepals* two, small; *Petals* four, the two outer equally spurred or gibbous at the base, deciduous. *Stamens* united in two sets of three each. *Stigma* two-crested and sometimes two-horned. *Pod* two-valved, ten to twenty-seeded. *Seeds* with a lateral crest.—Low, stemless perennials, with ternately compound and dissected leaves and simple scapes, bearing racemose nodding flowers. Pedicels two-bracted.

2. *FUMARIA*. *Sepals* two, caducous. *Petals* four, unequal, one of them spurred at the base. *Filaments* in two sets each with three anthers. *Style* deciduous. *Fruit*, an ovoid or globose achenium, small, one-seeded, and valveless. *Seeds* crestless.

ORDER X. BRASSICACEÆ, OR CRUCIFERÆ. MUSTARD.

Herbaceous plants, with a pungent, watery juice, very rarely suffruticose, with alternate *leaves* and no stipules. The *flowers* are yellow or white, rarely purple, without bracts, generally in racemes. *Sepals* four, deciduous. *Petals* four, hypogynous, alternate with the sepals, cruciate, regular, nearly equal. *Stamens* six, two of them inserted lower down and shorter than the others, which are in pairs. *Anthers* introrse. *Torus* with two or more glands, between the stamens and the ovary. *Ovary* generally of two cells, with a membranaceous false dissepiment. *Style* short or none, with a two-lobed, or double *stigma*. *Fruit* a silique or silicle, usually two-celled, many seeded, opening by the two valves separating from the permanent placenta; rarely one-celled, and indehiscent. *Seeds* campylotropous, mostly pendulous, attached in single rows to each edge of the placenta, with no albumen. *Embryo* with the cotyledons variously folded on the radicle.

SECTION I. SILICULOSÆ.

1. *COCHLEARIA*. *Calyx* equal at the base, spreading; sepals concave. *Petals* obovate, obtuse, entire. *Stamens* not toothed. *Style* short, or none. *Silicle* sessile, oblong or ovoid-globose; *dissepiment* thin; *valves* ventricose thickish; *cells* seldom two-seeded, usually many-seeded. *Seeds* not margined. *Cotyledons* flat, accumbent.—White flowers; leaves usually fleshy.

2. *IBERIS*. The two outside *petals* larger than the two inner. *Silicles* compressed, truncate, emarginate; *cells* one-seeded.—Exotic.

SECTION II. SILIQUOSÆ.

3. **CARDAMINE.** *Calyx* closed, or somewhat spreading, equal at the base. *Petals* unguiculate, entire. *Stamens* distinct, not toothed. *Pod* or *siliqua* sessile, linear, compressed, with flat nerveless valves rather narrower than the thickened dissepiment, and often separating with elasticity. *Style* short or wanting. *Stigma* nearly simple. *Seeds* ovate, in one row, not bordered, with a slender funiculus. *Cotyledons* accumbent.—Mostly perennials, with white or purple flowers.

4. **SISYMBRIUM.** *Calyx* mostly spreading, equal at base. *Petals* unguiculate, entire. *Siliqua* subterete; *valves* concave; *style* very short; *seeds* in a single series, ovoid; *cotyledons* incumbent, sometimes oblique.—Flowers small, white or yellow.

5. **SINAPIS.** *Sepals* equal at base, spreading. *Petals* obovate, with straight claws. *Stamens* distinct, entire. *Siliqua* subterete, with a short beak, two-celled, two-valved; *cells* many-seeded; *valves* concave, or keeled with a central nerve. *Style* short and acute, or ensiform, or rostrate subulate conical; seedless or one-seeded. *Seeds* globose, one rowed; *cotyledons* conduplicate.—Annuals or biennials, with the lower leaves lyrate, incised or pinnatifid; flowers always yellow.

ORDER XI. POLYGALACEÆ. MILKWORT.

Herbaceous or shrubby plants, sometimes twining, with alternate, or rarely opposite, mostly simple *leaves*, without stipules. The *flowers* are perfect, unsymmetrical. *Pedicels* with three bracts. *Sepals* five, often irregular and unequal, green, somewhat united at base; three exterior, of which one is superior, and two interior. *Petals* usually three, hypogynous, deciduous, one anterior and larger than the others, which are alternate with the upper and lateral sepals, sometimes united at base; or when five petals, the two additional ones are very small. *Stamens* six to eight, united by the anthers into two fasciculi; *anthers* innate, one-celled, opening at the apex. *Ovary* superior, compressed, two-celled, each cell with one pendulous ovule, rarely two to six, one cell often abortive. *Style* curved and often cucullate. *Fruit* a loculicidal, or indehiscent small capsule. *Seeds* pendulous with a fleshy albumen.

1. **POLYGALA.** *Sepals* five, persistent, two of them wing-shaped and petaloid. *Petals* three, cohering by their claws to the filaments, the lower one carinate, the two additional ones abortive. *Stamens* united into a tube at base, which is cleft in front; *anthers* opening by a pore. *Capsule* obcordate, compressed, two-celled, two-valved, two-seeded. *Seeds* pendulous, pubescent, with a carunculate arillus at the hilum; *albumen* abundant, fleshy; *embryo* large; *cotyledons* flat and broad.—Bitter plants, with the lower petal mostly tipped with a crest.

SUB-ORDER. KRAMERIACEÆ. RHATANY.

2. KRAMERIA. *Sepals* four or five, irregular, colored, spreading, deciduous. *Petals*, four or five, hypogynous, smaller than the sepals; two or three superior ones unguiculate; two lower ones small, scale-like. *Stamens* one, three, or four, hypogynous, unequal. *Ovary* one-celled, or incompletely two-celled; *style* terminal; *stigma* simple; *ovules* in pairs, suspended. *Fruit* between hairy and leathery, globose, covered with hooked prickles, by abortion one-seeded, indehiscent. *Seeds* roundish-ovate; *albumen* none.—Exotic.

ORDER XII. VIOLACEÆ. VIOLET.

Herbaceous or shrubby plants, with simple, alternate, sometimes opposite, stipulate *leaves*, involute in vernation. *Sepals* five, persistent, slightly united, elongated at base, the two lateral interior. *Petals* five, alternate with the sepals, hypogynous, usually unequal, the upper one generally spurred or saccate at base; twisted-imbricate in the bud. *Stamens* five, usually inserted on the hypogynous disk, alternate with the petals; *filaments* dilated and projecting beyond the anthers, and more or less coherent over the stigma, two of them usually with a gland at base. *Anthers* two-celled, introrse, opening longitudinally. *Ovary* one-celled, of three united carpels, with three parietal placentæ; *style* one, club-shaped, sometimes declined or curved, with an oblique cucullate stigma. *Fruit* a three-valved capsule, one-celled, many-seeded. *Seeds* often with a tumor at base, and a horny testa; *embryo* straight in the axis of a fleshy albumen; *cotyledons* flat.

1. VIOLA. *Sepals* five, oblong, acute, unequal, auricular at base. *Petals* five, unequal, the upper one (by resupination the lower,) broadest, spurred at base; the two lateral equal, opposite. *Stamens* five, approximate; *filaments* distinct; the two anterior having anthers that are often spurred; *anthers* connate, the lobes diverging at base. *Capsule* many-seeded, three-valved, bursting with elasticity, seeds attached to the valves.—Low herbaceous perennials, acaulescent or caulescent, with angular peduncles, and solitary flowers in a resupinate position.

ORDER XIII. CISTACEÆ. ROCK-ROSE.

Herbs or low shrubs, often with viscid branches, having opposite or alternate, simple, entire, usually feather-veined *leaves*; generally the lower are opposite, and the upper alternate. *Flowers* white, yellow, or red, very fugacious, in one-sided racemes. *Sepals* five, unequal, persistent, the three inner with a twisted æstivation; the two external small like bracts, sometimes wanting. *Petals* five, or by abortion three, fugacious, hypogynous, convolute in the opposite direction from the sepals in æstivation. *Stamens* indefinite, seldom few, distinct, hypogynous;

anthers short, innate. *Ovary* of three to five connected carpels; *styles* and *stigmas*, single or none, generally united. *Fruit*, capsular, either one-celled with parietal placentæ, or imperfectly three to five-celled, with dissepiments proceeding from the middle of the valves. *Seeds* few or numerous, on slender stalks, with the orifice at the apex; *embryo* slender, nearly straight or spirally convolute, in mealy albumen.

1. *HELIANTHEMUM*. *Sepals* five, the two outer smaller. *Petals* five, or rarely three by abortion, fugacious, crumpled in the bud. *Stamens* numerous. *Stigmas* three, scarcely distinct; *style* short or none. *Capsule* triangular, one-celled, three-valved, opening at top. *Seeds* angular; *embryo* curved like the letter S.—The flowers are yellow, open in sunshine, and cast their petals by the next day; roots perennial.

ORDER XIV. HYPERICACEÆ. ST. JOHN'S WORT.

Herbs, shrubs, or trees, with a resinous and acrid juice, and often with angular branches. *Leaves* opposite, entire, mostly sessile and punctate with pellucid dots, and black glands; no stipules. The *flowers* are perfect, mostly yellow, with cymose inflorescence. *Sepals* four or five, distinct or united at base, persistent, unequal, dotted, imbricated in æstivation. *Petals* four or five, hypogynous, veins oblique, dotted, twisted in æstivation, mostly deciduous. *Stamens* numerous, hypogynous, in three or more parcels. *Anthers* versatile, introrse. *Ovary* single, superior; *style* slender, persistent; *stigma* simple. *Fruit* a capsule or berry, two to five, rarely six or seven-lobed, many celled, with as many styles as lobes, which are sometimes united. *Seeds* numerous, minute, anatropous, with little or no albumen.

1. *HYPERICUM*. *Sepals* five, united at base, sub-equal, leaf-like. *Petals* five, oblique. *Stamens* few or numerous, united at base into three or five parcels, with no glands between them. *Styles* three to five, distinct or rarely united at base, persistent. *Capsules* unilocular, or with several cells, membranaceous, three to five-valved, many-seeded. *Seeds* roundish; *seed-coat* double; *albumen* none; *embryo* with semicylindrical cotyledons.—Herbaceous or shrubby plants, with opposite, entire, pellucid, punctate leaves, and yellow, solitary flowers, or in cymose panicles.

ORDER XV. CARYOPHYLLACEÆ. PINK.

Herbs with the stems swelling at the joints or nodes, with opposite, entire leaves, the uppermost rarely alternate, and destitute of stipules. *Flowers* regular. *Sepals* four or five, distinct, or cohering in a tube, continuous with the peduncle, persistent. *Petals* four or five, sometimes none, either unguiculate and inserted upon the pedicel of the ovary, or without claws and inserted on the outside of a fleshy disk. *Stamens*

twice as many as the petals, rarely equal or few; *filaments* subulate, sometimes monadelphous; *anthers* innate, two-celled, with a longitudinal dehiscence. *Ovary* often stipitate; *styles* stigmatic the whole length of their inner surface; *stigmas* two to five, filiform. *Fruit* a one-celled capsule, rarely two to five-celled, opening at the apex by twice as many teeth as there are stigmas. *Seeds* numerous, campylotropous; *albumen* mealy; *embryo* external, curved round the albumen, or sometimes straight.

TRIBE I. ALSINEÆ.

Sepals distinct or nearly so. Petals without claws inserted on the outside of the disk. Stamens inserted on the margin of the disk.

1. STELLARIA. *Sepals* five, connected at base. *Petals* two to five parted. *Stamens* ten, rarely fewer; *styles* three, sometimes four. *Capsule* superior, one-celled, three-valved, many-seeded.—Small grass-like herbs, in moist, shady places, with white flowers in forked cymes.

TRIBE II. SILENEÆ.

Sepals united into a cylindrical tube. Petals clawed, inserted with the stamens upon the stipe of the ovary.

2. SAPONARIA. *Calyx* tubular, five-toothed, without scales. *Petals* five, unguiculate. *Stamens* ten; *styles* two; *capsule* short-stalked, oblong, one-celled, or partly two-celled at the base, four-toothed at the apex. *Embryo* coiled into a ring.—Perennials with a mucilaginous juice, flowers in cymose clusters, petals often crowned.

ORDER XVI. LINACEÆ. FLAX.

Herbaceous or shrubby plants with sessile, entire, alternate, sometimes nearly opposite *leaves*, without stipules. *Flowers* terminal, usually in corymbs or panicles, regular and symmetrical. *Sepals* three, four, or generally five, distinct, or more or less united, persistent; æstivation strongly imbricated. *Petals* as many as sepals, and alternate with them, hypogynous, unguiculate, caducous, twisted in æstivation. *Stamens* equal in number to the petals, united at base into a hypogynous ring, which is often toothed, often with an abortive filament between each; *anthers* innate. *Ovary* with as many cells as there are sepals and styles, with capitate stigmas. *Fruit* a globose capsule, with three, four, or five cells, containing two seeds in each cell. *Seeds* suspended, compressed. *Albumen* none, or very thin; *testa* mucilaginous; *embryo* flat, oily.

1. LINUM. *Sepals*, *petals*, *stamens* and *styles* five, the latter rarely three. *Capsule* globose, five-celled; *cells* nearly divided by a false

dissepiment. *Seeds* ovate, compressed, anatropous, mucilaginous, containing a large embryo with plano-convex cotyledons.—Herbs with a fibrous bark, and terminal, corymbose or panicled flowers.

ORDER XVII. GERANIACEÆ. GERANIUM.

Plants with herbaceous or shrubby stems, tumid and separable at the nodes, with opposite or alternate *leaves*, petiolate, palmately-veined, mostly stipulate. *Flowers* on terminal peduncles, or opposite the leaves, sometimes axillary. *Sepals* five, persistent, veined, one sometimes saccate or spurred at the base, with an imbricate æstivation. *Petals* five, or by abortion four, hypogynous, or perigynous, unguiculate, with a twisted æstivation. *Stamens* usually monadelphous, hypogynous, twice or thrice as many as the petals; *anthers* fixed by the middle, introrse. *Ovary* of five lobes, each one or two-celled, placed alternate with the sepals, round an elongated, elevated axis; *styles* five, persistent, cohering round the axis. *Fruit* five carpels, united to the central axis, membranaceous, and when mature separating by the twisting of the style. *Seeds* solitary, exalbuminous, with a lateral hilum; *radicle* straight; *cotyledons* convolute, plaited.

1. GERANIUM. *Sepals* and *petals* each five, equal. *Stamens* ten, fertile, the five alternate ones longer, and each with a nectariferous gland at its base. *Fruit* rostrate, at length separating into five long-styled, one-seeded carpels; *styles* smooth inside, at length recurved from the base upward and adhering by the point to the summit of the axis.—Perennial herbs, with forking stems, rarely shrubby at base; peduncles one to three-flowered.

ORDER XVIII. OXALIDACEÆ. WOOD-SORREL.

Plants with sour juice, low, herbaceous stems, alternate and compound *leaves*; stipules rarely present. *Flowers* regular and symmetrical. *Sepals* five, persistent, equal, sometimes slightly cohering at base, imbricated in æstivation. *Petals* five, hypogynous, deciduous, equal, unguiculate, twisted in æstivation. *Stamens* ten, hypogynous, more or less monadelphous, those opposite the petals longest. *Ovary* of five united carpels, opposite the petals; *styles* five, distinct. *Fruit* capsular, usually membranaceous, five-lobed, five-celled; *carpels* one to twelve-seeded. *Seeds* anatropous; *embryo* straight; *cotyledons* broad and foliaceous.

1. OXALIS. *Sepals* five, distinct or united at base, persistent. *Petals* five, withering after expansion. *Stamens* ten; *filaments* slightly monadelphous. *Styles* five, capitate. *Capsule* oblong or subglobose; *carpels* five, one to several-seeded. *Seeds* with an elastic testa, pendulous from

the axis, their outer coat loose and separating; *albumen* fleshy.—Perennials, mostly with trifoliate leaves.

ORDER XIX. BALSAMINACEÆ. JEWEL WEEDS.

Annual herbs with succulent stems and a bland watery juice. *Leaves* simple, without stipules. *Flowers* very irregular and unsymmetrical. *Sepals* five, deciduous, the two upper connate, the lowest spurred or gibbous. *Petals* four, hypogynous, united by pairs, or rarely five, distinct. *Stamens* five, hypogynous; *filaments* subulate; *anthers* two-celled. *Ovary* five-celled, compound. *Stigmas* sessile. *Fruit* capsular, five-celled, bursting elastically by five valves. *Seeds* anatropous, several in each cell; *embryo* straight; *albumen* none.

1. IMPATIENS. *Calyx* and *corolla* colored alike and confounded, imbricated in the bud. *Sepals* apparently but four; the two upper being united, with a notch at the apex, the lowest gibbous and spurred. *Petals* apparently two, each of the lower being united to the two lateral ones. *Anthers* cohering at the apex, and opening on the inner face. *Capsule* often one-celled by the obliteration of the dissepiments, five valved, bursting elastically.—Annuals, with tender, smooth, juicy, and sub-pellucid stems with tumid joints.

ORDER XX. XANTHOXYLACEÆ. PRICKLY ASH.

Trees or shrubs, pungent and bitter-aromatic, with alternate or opposite pinnate, rarely simple *leaves*, with pellucid dots and no stipules. The *flowers* are regular, gray, green, or pink, diœcious, or polygamous by abortion. *Sepals* three to five, rarely six to nine, connected at base. *Petals* as many as sepals, and longer, sometimes wanting, twisted in æstivation. *Stamens* alternate with the petals, of the same number, seldom twice as many; in the pistillate flowers either wanting or imperfect; *anthers* introrse. *Ovaries* usually of the same number as sepals, stipitate, distinct or united; *ovules* two to four in each carpel; *styles* distinct, or connate when the ovaries are separate, and combined when these are united. *Fruit* baccate, membranaceous, or drupaceous, of one to five drupes or two-valved capsules. *Seeds* solitary or in pairs, pendulous; *embryo* within a fleshy albumen; *cotyledons* oval, flat.

1. XANTHOXYLUM. *Flowers* diœcious. *Calyx* inferior. *Sepals* three to five, petaloid when there are no petals. *Petals* as many and longer than the sepals, sometimes wanting. Male flowers; *stamens* as many as the sepals, equal to them or longer, inserted round the base of the gynophore. *Pistils* rudimentary, simple or compound. Female flowers; *stamens* usually wanting, sometimes very short, and either with or without abortive anthers. *Pistils* three to five, raised on a short

base or stalk, distinct; *styles*, one from the apex of each ovary, distinct or united at the apex; sometimes very short or scarcely any. *Ovaries* one to five, on a globose or cylindrical gynophore; *ovules* two in each cell, suspended, collateral. *Capsules* one to five, sessile, or stalked on the gynophore (receptacle,) two-valved, one or two-seeded. *Seeds* black and shining; when solitary globose, when in pairs hemispherical: *embryo* straight or slightly curved.—Trees or shrubs, usually with prickles on the branches, petioles, and nerves of the leaves; leaves pinnately three to five-foliate.

2. PTELEA. *Flowers* polygamous. *Sepals* three to six, mostly four, much shorter than the three to six, spreading petals. Male flowers; *stamens* three to six, longer than the petals and alternate with them, inserted round a receptacle bearing a sterile pistil. Female flowers; *stamens* very short and imperfect. *Ovary* on a convex receptacle, compressed, two-celled, formed of two united carpels; *styles* short, united, or wanting; *stigmas* two. *Fruit* a two-celled, two-seeded samara, compressed, membranous, indehiscent, winged all round, nearly orbicular.—Shrubs with three to five foliate leaves, and greenish-white small flowers in compound terminal cymes.

ORDER XXI. SIMARUBACEÆ. QUASSIA.

Flowers hermaphrodite or unisexual. *Calyx* four or five-sepaled, persistent. *Petals* four or five, hypogynous, deciduous, aestivation twisted. *Stamens* equal or twice as many as the petals, placed on a hypogynous disk. *Ovary* four to five-lobed, containing one suspended ovule in each cell; *style* single, filiform, larger at base. *Carpels* as many as petals, capsular, bivalved, opening inwardly, monospermous. *Seeds* pendulous, exalbuminous, with two thick *cotyledons*, and a short, superior radicle.

1. SIMARUBA. *Flowers* unisexual. *Calyx* small, cup-shaped, five-parted. *Petals* five, longer, spreading. Male flowers; *stamens* nearly as long as the petals, arranged round a receptacle, having five minute lobes at its apex, (rudiments of ovaries,) sometimes none. Female flowers; *ovaries* five, placed on an even disk, surrounded at the base by ten short hairy scales, (rudiments of stamens). *Styles* five, short, distinct at the base, united at apex and crowned by a broad five-lobed stigma. *Fruit* five drupes.

2. QUASSIA. *Flowers* hermaphrodite. *Sepals* five. *Petals* five, longer than the sepals, and arranged in a tubular form. *Stamens* ten, longer than the petals; *anthers* transverse. *Ovaries* five, placed on a receptacle broader than themselves; *styles* five, distinct at base, united at apex, and terminating in a nearly equal five-furrowed stigma. *Fruit* drupaceous.

3. *PICRÆNA*. *Flowers* polygamous. *Sepals* five, minute. *Petals* five, longer than the sepals. *Stamens* five, about as long as the petals, rather shaggy; *anthers* roundish. *Ovaries* three, seated on a round, tumid receptacle. *Style* three-cornered, trifid; *stigmas* simple, spreading. *Fruit* three drupes, globose, one-celled, two-valved, distant from each other, and placed on a broad, hemispherical receptacle.

ORDER XXII. ANACARDIACEÆ. SUMACH.

Trees or shrubs with a resinous, gummy, caustic, or even milky juice, with dotless, alternate, simple, or ternate, or unequally pinnate leaves. *Flowers* terminal or axillary, commonly diœcious, with bracts. *Sepals* three to seven, usually five and persistent. *Petals* as many as sepals or wanting; æstivation imbricated. *Stamens* as many as sepals, alternate with the petals, distinct, on the base of the calyx; *anthers* introrse. *Ovary* solitary, free, one-celled, with a solitary ovule; *styles* three to five, or wanting; *stigmas* three. *Fruit* indehiscent, commonly drupaceous, one-seeded. *Seeds* erect or suspended, exalbuminous; *embryo* more or less curved; *cotyledons* very thick and fleshy, sometimes foliaceous.

1. *RHUS*. *Flowers* polygamous or hermaphrodite. *Sepals* five, united at base, persistent. *Petals* five, ovate, spreading. *Stamens* five, rarely ten, equal, free. *Disk* orbicular. *Styles* three, short, distinct, or united. *Stigmas* three, capitate. *Fruit* almost a dry drupe, subglobose, one-seeded. *Seed* solitary, suspended on a funiculus, arising from the base of the nut; *embryo* inverted; *cotyledons* foliaceous; *radicle* opposite to the hilum, bent downward along the margin of the cotyledons.—Small shrubs or trees, with alternate, mostly compound leaves; peduncles axillary or terminal.

2. *PISTACIA*. *Flowers* diœcious, apetalous. Males; *sepals* five; *stamens* five; *anthers* sub-sessile, four-cornered. Females; *calyx* three or four-cleft; *styles* three; *stigmas* three. *Drupe*, dry, ovate, one-seeded; *seeds* solitary, erect, exalbuminous; *cotyledons* thick, fleshy, oily, with a superior lateral radicle.

ORDER XXIII. RUTACEÆ. RUE.

Herbs, shrubs, or trees, with punctate leaves and no stipules. *Flowers* perfect. *Sepals* and *petals* four or five, the latter rarely wanting; æstivation a little twisted, sometimes valvular. *Stamens* as many, or twice or thrice as many as the petals, or fewer by abortion, hypogynous, on the outside of a cup-like disk surrounding the ovary, and free or combined with the base of the corolla. *Ovary*, sessile or stipitate,

its lobes equal in number to the petals, or fewer; *styles* united or distinct only at base; *stigma* simple or dilated. *Fruit* of several capsules, either firmly united, or more or less distinct. *Seeds* two or solitary, with a testaceous integument; *embryo* with or without albumen; *cotyledons* variable.

1. RUTA. *Sepals* four or five, united at base, at length deciduous. *Petals* equal in number to sepals, concave, obovate, distinct, longer than the calyx, unguiculate; the limb vaulted, usually waved or jagged. *Stamens* twice as many as the petals; *filaments* subulate, glabrous; *anthers* ovate, obtuse. *Torus* surrounded with as many nectariferous pores or glands as there are stamens. *Styles* four, distinct at the base, united above; *stigma* four-furrowed. *Capsules* somewhat globose, four-lobed, dehiscing internally at the apex. *Seeds* dotted.—Exotic.

2. BAROSMA. *Sepals* five, united at base, dotted. *Disk* at the base of calyx with a small rim. *Petals* five, unguiculate. *Stamens* ten, the five opposite the petals are sterile, petaloid, sessile, ciliated, and obscurely glandular at base; the other five longer, smooth, or hispid, subulate; *anthers* with a minute gland at the apex. *Style* as long as the petals; *stigma* minute, five-lobed. *Fruit* five cocci covered with glandular dots at the back.

3. GALIPEA. *Calyx* short, cup-shaped, five-toothed. *Petals* five, longer than the calyx, somewhat unequal, united at base into a short tube, bell-shaped. *Stamens* five to eight, adhering to the tube of the corolla, of which two to four are sterile, or five all fertile; *anthers* oblong, sometimes revolute after flowering. *Style* one, bearing a four or five-grooved *stigma*. *Capsules* five, sometimes by abortion fewer; *seeds* solitary by abortion.

ORDER XXIV. AURANTIACEÆ. ORANGE.

Trees or shrubs glabrous, abounding in little transparent receptacles of volatile oil, with alternate *leaves*, articulated with the petioles, which are frequently winged. *Sepals* three to five, united into a short urceolate or campanulate cup, marescent. *Petals* three to five, broad at base, slightly imbricated in æstivation, inserted on the outside of a hypogynous disk. *Stamens* as many as the petals, or some multiple of their number, in a single row, hypogynous; *filaments* flattened below, distinct or united; *anthers* terminal, innate. *Ovary* many-celled, composed of several united carpels; *style* one, cylindrical; *stigma* slightly divided, somewhat lobed. *Fruit* globular, large, baccate, pulpy, many-celled, covered with a leathery indehiscent rind, abounding with

vesicles of volatile oil. *Seeds* solitary or many, attached to the inner angle of each cell, usually pendulous; raphe and chalaza usually very distinctly marked, exalbuminous; *embryo* straight; *cotyledons* thick and fleshy.

1. CITRUS. *Calyx* three to five-cleft, urceolate. *Petals* three to eight, oblong. *Stamens* twenty to sixty; filaments dilated at base, polyadelphous; *anthers* oblong. *Style* terete; *stigma* hemispherical. *Fruit* baccate, seven to twelve or eighteen-celled; *cells* with several seeds, filled with a fleshy substance composed of numerous irregular pulpy bags or vesicles, which are mere cellular extensions of the sides of the carpels.—Trees or shrubs with axillary solitary spines, simple leaves articulated with the petiole, or pinnate leaves reduced to one terminal leaflet, odoriferous flowers, and delicious fruit.

ORDER XXV. TERNSTROMIACEÆ. TEA.

Trees or shrubs with alternate, coriaceous, exstipulate *leaves*. The *flowers* axillary or terminal, white, rarely red or pink. *Sepals* three to seven, concave, coriaceous, deciduous, the inner often the largest; imbricate in æstivation. *Petals* mostly five, but sometimes six or nine, hypogynous, alternate with the sepals, often united at base. *Stamens* numerous, inserted on the petals; *filaments* distinct, or usually united in one or more sets at base; *anthers* adnate or versatile. *Ovary* superior, two to seven-celled, usually sessile on a discoid torus; *ovules* two or more in each cell; *styles* two to seven, distinct or united. *Fruit* two to seven-celled, capsular, baccate, or coriaceous and indehiscent. *Seeds* commonly few and large, somewhat reniform, downy, albuminous, or exalbuminous; *embryo* curved or straight; *cotyledons* often large, and containing oil.

1. THEA. *Calyx* without bracts; *sepals* five or six, rounded, imbricated, equal. *Petals* five to nine, sessile, unequal, the outer shorter. *Stamens* numerous, smooth, adhering to the very base of the petals; *style* simple at the base, trifid upward. *Capsule* spheroidal, three-celled, often by abortion one-celled; *cells* opening at the apex, one or rarely two-seeded. *Seeds* spheroidal, wingless.

ORDER XXVI. ZYGOPHYLLACEÆ. GUAIACUM.

Flowers regular. *Sepals* five, distinct, or scarcely cohering at base. *Petals* five, alternate with the sepals, unguiculate, inserted on the receptacle. *Stamens* twice as many as the petals, hypogynous; *anthers* fixed near their middle. *Ovary* of four or five united carpels, surrounded at base with five scales on a sinuate disk. *Styles* five, united into one. *Fruit* a capsule of five carpels, four or five-seeded, dehiscent at the

superior angle. *Seeds* albuminous or exalbuminous; *albumen* cartilaginous or horny; *embryo* green, straight; *cotyledons* foliaceous.

1. *GUAIACUM*. *Calyx* deeply five-parted, unequal, obtuse. *Petals* five, longer than the sepals, equal, unguiculate. *Stamens* ten, without scales. *Ovary* stipitate with two to five angles, two to five cells, and about eight suspended ovules in a cell. *Styles* short, acute, and united. *Capsule*, on a very short stalk, somewhat fleshy, angular. *Seeds* solitary by abortion, smooth, pendulous.

ORDER XXVII. MALVACEÆ. MALLOWS.

Herbs, shrubs or trees with alternate, stipulate and divided leaves; *hairs* stellate or none. The *flowers* are axillary, showy, regular, often with an involucl at base. *Sepals* five, seldom three or four, united at base, persistent, valvate in æstivation. *Petals* five, hypogynous, valvate in æstivation. *Stamens* as many as the petals, or some multiple of them, hypogynous, monadelphous; *anthers* reniform, one-celled, opening transversely. *Ovary* of several carpels, arranged in one or more rows around a common axis, distinct or coherent. *Styles* as many as carpels, united or distinct. *Stigmas* as many, or twice as many as styles. *Fruit* capsular or baccate; *carpels* one or many-seeded, distinct or united, the dehiscence septicidal or loculicidal. *Seeds* sometimes hairy, exalbuminous; *embryo* curved; *cotyledons* foliaceous, twisted.

1. *MALVA*. *Calyx* five-cleft, the *involucl* mostly three-leaved, somewhat like an outer calyx. *Styles* and *carpels* numerous. *Fruit* depressed, separating at maturity into as many one-seeded, and usually indehiscent reniform little pods as there are styles, arranged circularly. *Radicle* pointing downward.—Perennials, with perfect flowers.

2. *ALTHÆA*. *Calyx* surrounded at base by a six to nine-cleft involucl. *Carpels* numerous, capsular, closely and circularly arranged round the axis.

3. *GOSSYPIUM*. *Calyx* cup-shaped, obtusely five-toothed, surrounded by an involucl of three cordate leaves, deeply and incisely toothed. *Stigmas* three to five. *Capsules* three to five-celled, loculicidal. *Seeds* numerous, imbedded in cotton.—Plants with yellow flowers.

4. *ABELMOSCHUS*. *HIBISCUS*. *Calyx* five-toothed, spathaceous, deciduous, surrounded by a five to ten-leaved involucl, often very caducous. *Ovarium* five-celled; *cells* with many ovules. *Style* one, five-cleft at the apex. *Stigmas* five. *Capsule* five-celled, five-valved, loculicidal, polyspermous. *Seeds* naked.

ORDER XXVIII. VITACEÆ. GRAPE-VINES.

Shrubs climbing by tendrils, with tumid, separable joints. *Leaves* simple or compound, the lower opposite, upper alternate. The *flowers* are racemose, often polygamous or dioecious. *Calyx* minute, nearly entire or five-toothed. *Corolla* with four or five petals inserted on the outside of a hypogynous disk, valvate and inflexed in æstivation, often cohering above and caducous. *Stamens* four or five, opposite the petals, inserted on the disk; *anthers* ovate, versatile. *Ovary* superior, two-celled, with two erect, collateral ovules in each cell. *Style* one, very short, with a simple *stigma*. *Fruit* a globose, pulpy berry, two-celled, four-seeded, often from abortion one-celled. *Seeds* with a hard, bony testa, and a cartilaginous, or fleshy albumen; *embryo* shorter than the albumen; *radicle* slender; *cotyledons* lanceolate or subulate.

1. VITIS. *Calyx* nearly entire, somewhat five-toothed. *Petals* four or five, united at apex, distinct at base, deciduous. *Disk* elevated in the center, and bearing the stamens at base. *Stamens* five. *Ovary* partly inclosed within the torus, two-celled; *cells* two-ovuled; *style* short, or none; *stigma* capitate. *Berry* one to four-seeded, cells and seeds often abortive.—Peduncles often changed into tendrils.

2. AMPELOPSIS. *Calyx* entire or slightly five-toothed. *Petals* five, concave, distinct, spreading, deciduous after expansion. *Ovary* two-celled. No five-lobed ring around the ovary. *Style* very short; *berry* two-celled; *cells* one or two seeded.—Vine with digitate leaves having five leaflets and flowers in cymose-clusters.

ORDER XXIX. HIPPOCASTANACEÆ. ÆSCULACEÆ. BUCKEYE.

Trees or shrubs, with opposite, rarely alternate, compound *leaves*, without stipules. *Flowers* showy, with the pedicels articulated. *Calyx* campanulate, of five united sepals. *Petals* five, one of them sometimes abortive, unequal, hypogynous. *Stamens* six to eight, distinct, unequal, inserted upon a disk with the petals. *Ovary* roundish, three-cornered, three-celled, crowned with a single, filiform, conical style; *cells* two ovules in each, only one of which, or one in each cell, ripens into a seed. *Fruit* roundish, coriaceous, with one to three large, roundish, smooth seeds. *Seeds* with a thick and shining coat and a large round pale scar, without albumen; *cotyledons* very thick and fleshy, somewhat crumpled and united, remaining under ground in germination; *plumule* two-leaved; *radicle* conical, curved.

ORDER XXX. SAPINDACEÆ.

Trees, shrubs, or herbs, the latter furnished with tendrils. *Leaves* alternate, usually compound, and without stipules. *Flowers* small, usually

polygamous. *Sepals* four or five, imbricated in aestivation. *Petals* four or five, sometimes wanting, alternate with the sepals, hypogynous, sometimes naked, sometimes with a doubled appendage on the inside. *Disk* fleshy, regular, expanded between the petals and stamens, sometimes glandular, the glands between the stamens and petals. *Stamens* eight to ten, seldom twenty, inserted on the disk, or on the receptacle; *filaments* free, or connected at base; *anthers* introrse. *Ovary* three-celled, rarely two or four-celled; *cells* containing one to three, seldom more, ovules. *Style* simple, or two or three-cleft. *Fruit* sometimes capsular, two or three-valved, sometimes a samara, sometimes fleshy and indehiscent. *Seeds* one to three in each cell, usually arilled, exalbuminous; the outer integument crustaceous, or membranous, the inner pellucid; *embryo* curved or spiral, seldom straight.

1. *ÆSCULUS*. *Calyx* campanulate, or tubular, five-lobed. *Petals* four or five, irregular, unequal, expanded, with an ovate limb. *Filaments* curved inward. *Capsules* prickly.—Trees with palmately five or seven-foliate leaves, leaflets sessile or nearly so; *flowers* in thyrselike panicles.

ORDER XXXI. CELASTRACEÆ. SPINDLE-TREE.

Shrubs, or rarely trees, with opposite or alternate leaves, and *flowers* not always perfect. *Sepals* four or five, united at base, imbricated, and inserted in the edge of an expanded disk. *Petals* as many as sepals, inserted by a broad base under the margin of the flat, expanded disk, which surrounds the ovary. *Stamens* as many as petals, and alternate with them, inserted on the margin, or within the edge of the disk; *anthers* innate. *Ovary* superior, immersed in and adhering to the disk. *Fruit* drupaceous or capsular, two to five-celled. *Seeds* solitary or few, anatropous, either arillate or the reverse; *embryo* large; *albumen* fleshy; *cotyledons* broad and leaf-like.

TRIBE I. STAPHYLEÆ.

Leaves pinnate, opposite. Seeds bony, not arilled. Cotyledons thick. Ovary many-ovuled, free from the cup-shaped disk.

1. *STAPHYLEA*. *Flowers* perfect. *Sepals* five, colored, erect, persistent. *Petals* five, with short claws. *Stamens* five. *Pistil* of three carpels united in the axis, their long styles cohering, but separating as the ovary enlarges into the membranaceous, inflated, three-lobed and three-celled pod. *Seeds* two or three in each cell, naked and bony.—Upright shrubs with opposite pinnate leaves, and white flowers in terminal, drooping, raceme-like clusters.

TRIBE II. EUONYMEÆ.

Leaves simple. Ovules two in each cell; style one; stigma three-lobed. Disk adhering to the bottom of the calyx. Seeds with pulpy arils. Cotyledons leafy.

2. CELASTRUS. *Flowers* sometimes polygamous. *Calyx* flat, of five united sepals. *Corolla* spreading, of five sessile petals. *Disk* fleshy, orbicular. *Stamens* five, inserted into or under the margin of the cup-shaped disk; *anthers* opening longitudinally. *Ovary* two or three-celled; *ovules* usually in pairs, rarely five or six in each cell. *Styles* thick, entire, or two-cleft. *Capsule* subglobose, or three-angled, three-celled, the dissepiments sometimes incomplete or evanescent. *Seeds* one or two in each cell, inclosed by a pulpy scarlet aril.—Climbing shrubs with alternate, deciduous leaves; minute, deciduous stipules, and small, greenish flowers, in terminal or axillary raceme-like clusters.

3. EUONYMUS. *Calyx* flat, of five, sometimes four or six, united sepals. *Petals* four or five, rounded, spreading, inserted on the outer margin of a glandular disk. *Stamens* five, with short filaments, inserted on the upper face of a broad and flat four or five-angled disk, which coheres with the calyx and is stretched over the ovary. *Style* short or none. *Capsule* colored, five-angled, five-celled, five-valved, loculicidal. *Seeds* one or two in each cell, inclosed in a red aril.—Shrubs erect or trailing, with four-sided branchlets, opposite serrate leaves, and loose cymes of small green, or dark purple flowers, on axillary peduncles.

ORDER XXXII. RHAMNACEÆ. BUCKTHORN.

Shrubs or trees often spiny, with simple, alternate leaves, and minute or no stipules. *Flowers* small, axillary or terminal, greenish, sometimes diœcious. *Sepals* four or five, united at base, valvate in æstivation. *Petals* four or five, sometimes wanting, distinct, cucullate or convolute, inserted into the orifice of the calyx. *Stamens* as many as the petals, opposite to them; *anthers* introrse, or versatile. *Ovary* superior, or half-superior, two to four-celled, with a solitary, erect ovule in each cell. *Styles* more or less united. *Stigmas* usually distinct, simple. *Fruit* sometimes dry and capsular, dehiscing by three valves, sometimes fleshy and indehiscent. *Seed* erect, not arilled; *albumen* fleshy; *embryo* large, erect; *radicle* short; *cotyledons* large, flat.

1. RHAMNUS. *Calyx* urceolate, four or five-cleft, often circumscissile after flowering, the lower part permanent. *Petals* four or five, or none, emarginate at the apex and slightly convolute, or nearly flat, inserted

upon the calyx. *Stamens* opposite the petals; *anthers* ovate, two-celled. *Torus* thin, lining the tube of the calyx. *Ovary* free from the calyx, not immersed in the torus, two to four-celled. *Styles* two to four, more or less connected, or distinct. *Fruit* drupaceous, two to four-celled, containing two to four indehiscent, cartilaginous seeds, one of them occasionally abortive. *Seeds* with a deep groove.—Shrubs or small trees with leaves mostly alternate, and minute flowers in short axillary clusters, often polygamous.

2. CEANOTHUS. *Calyx* tubular, campanulate, five-cleft, separating transversely after flowering, the lower part permanent. *Petals* five, hood-form, unguiculate. *Stamens* five, exserted. *Styles* two or three, united to the middle, diverging above. *Capsule* obtusely triangular, three-celled, three-seeded, surrounded at base by the persistent tube of the calyx; dry and splitting into its three carpels when ripe; *valves* papery; *cells* one-seeded, opening by the inner suture.—Shrubby plants, unarmed, with alternate leaves, and white, blue, or yellowish flowers, in umbel-like clusters.

ORDER XXXIII. AMYRIDACEÆ. BALSAMIC TREES.

Trees or shrubs abounding in a balsamic juice, with alternate or opposite *leaves*, which are ternate or unequally pinnate, sometimes with stipules, and occasionally with pellucid dots. The *flowers* are hermaphrodite, or sometimes unisexual by abortion. *Sepals* two to five, persistent. *Petals* three to five, inserted below a disk, arising from the calyx, with a valvate and occasionally an imbricate æstivation. *Stamens* two or four times as many as the petals, all fertile. *Disk* orbicular or annular. *Ovary* one to five-celled, superior, sessile in or on the disk. *Style* solitary and compound; *stigmas* equal in number to the cells. *Fruit* hard and dry, one to five-celled, with its outer part often valvular. *Seeds* exalbuminous. *Cotyledons* wrinkled, plaited or amygdaloid. *Radicule* straight.

1. BALSAMODENDRON. *Flowers* irregular. *Calyx* four-toothed, persistent. *Petals* four, oblong-linear. *Stamens* eight, with elevated warts between them. *Ovary* single supporting a short, obtuse *style*. *Drupe* ovate, acute, with four sutures, one or two-celled. *Cells* one-seeded.

2. BOSWELLIA. (NAT. ORD. BURSERACEÆ OF LINDLEY. Terebintaceæ, of KUNTH.) *Flowers* bisexual. *Calyx* small, five-toothed, persistent. *Petals* five, obovate-oblong, acute at base. *Stamens* ten, inserted under a torus. *Torus* a crenate ring around the base of the ovary. *Style* one, caducous. *Capsule* triangular, three-valved, three-celled. *Seeds* solitary, winged. (See *Copaifera* and *Myrospermum*, under *Fabaceæ*.)

ORDER XXXIV. MELIACEÆ. CANELLÆ.

Trees and shrubs with alternate or occasionally somewhat opposite leaves, which are simple or pinnate, and without stipules. *Sepals* three to five, somewhat united at base. *Petals* three to five, hypogynous, uniting at base, sometimes unequal, imbricate in æstivation. *Stamens* as many or twice as many as the petals, monadelphous at base, inserted on the outside of the torus. *Anthers* sessile, within the ring of filaments. *Ovary* three to five-celled, each cell containing one or two ovules. *Styles* and *stigmas* usually united into one, three to five-lobed. *Fruit* drupaceous, baccate, or capsular, three to five-celled, each one or two-seeded, when dehiscent, loculicidal. *Seeds* never winged or flat; *albumen* scanty or none.

1. MELIA. *Calyx* small, five-parted, sepals united below. *Petals* five, oblong, spreading. *Stamens* ten, united into a tube, bearing ten anthers in the orifice; *segments*, two or three-parted; *anthers* opposite to the segments and a little shorter, oblong, slightly apiculate. *Ovary* seated on a short disk, five-celled; *cells* with two superposed ovules each. *Style* columnar, breaking off from the top of the ovary, with a five-lobed stigma. *Fruit* a drupe, ovate, with a five-celled bony nut; *cells* one-seeded. *Cotyledons* foliaceous.

2. CANELLA. *Sepals* five. *Petals* five, somewhat coriaceous, glaucous, twisted in æstivation. *Stamens* fifteen, connected, with fifteen furrowed *anthers*. *Stigmas* three. *Berry* three-celled, or by abortion one; *cells* one or two-seeded; *embryo* surrounded by fleshy albumen, curved, with linear *cotyledons*.

ORDER XXXV. CLUSIACEÆ OR GUTTIFERÆ. GAMBOGE.

Trees or shrubs, some of which are parasitical. *Leaves* opposite, rarely alternate, coriaceous, with a strong midrib and numerous lateral veins, and without stipules. *Flowers* axillary or terminal, and articulated with their peduncle; hermaphrodite or unisexual. *Sepals* two or six, usually persistent, æstivation imbricated. *Petals* hypogynous, four to ten. *Stamens* numerous, distinct, or united in one or more parcels; *filaments* unequal; *anthers* adnate, introrse or extrorse. *Torus* fleshy, sometimes five-lobed. *Ovary* solitary, superior, one or many-celled. *Ovules* solitary, erect. *Style* none or very short. *Stigma* peltate or radiate. *Fruit* dry or succulent, one or many-celled, one or many-seeded, dehiscent or indehiscent. *Seeds* immersed in a pulp, apterous, often with an arillus. *Testa* thin and membranaceous, exalbuminous. *Embryo* straight.—Abounding in a viscid, acrid, yellow, and purgative gum-resinous juice; tropical.

1. *HEBRADENDRON*. *Flowers* unisexual. Males; *sepals* four, membranous, persistent. *Petals* four. *Stamens* monadelphous, with a quadrangular column; *anthers* terminal, with an umbilicate, circumscissile operculum. Females unknown. *Berry* many or four-celled; *cells* one-seeded, surrounded by a few abortive distinct stamens and crowned by a sessile-lobed muricated stigma. *Cotyledons* thick, consolidated. *Radicle* central, filiform.

ORDER XXXVI. FABACEÆ OR LEGUMINOSÆ. LEGUMINOUS PLANTS.

Herbs, shrubs, or trees, with alternate, usually compound *leaves*, margins entire, sometimes reduced to a single leaflet. *Stipules* two at the tumid base of the petiole; *stipels* commonly two. *Flowers* are most generally papilionaceous, solitary, in racemes or panicles, usually with articulated peduncles, and often with two bracts under each flower. *Sepals* generally five, more or less united, often unequal. *Petals* five, perigynous or hypogynous, irregular and unequal, or regular, distinct or cohering, the odd petal superior. *Stamens* definite or indefinite, distinct, monadelphous, or diadelphous, inserted with the petals; *anthers* versatile. *Ovary* superior, solitary, distinct from the calyx; *ovules* one or several; *style* and *stigma* simple. *Fruit* a legume or drupe. *Seeds* solitary or many, sometimes with an aril or large caruncle, exalbuminous. *Embryo* straight, or with the radicle bent back along the edge of the cotyledons; *cotyledons* thick and fleshy, or thin and somewhat foliaceous.

SUB-ORDER I. PAPILIONACEÆ.

Petals truly papilionaceous, imbricate in æstivation, the upper one external. *Stamens* mostly ten and diadelphous. *Flowers* usually perfect.

1. *ROBINIA*. *Calyx* short, campanulate, five-cleft, the two upper segments more or less coherent. *Vexillum* large and rounded, turned back, scarcely longer than the wings and keel. *Stamens* diadelphous, nine and one. *Style* bearded inside. *Legume* linear, compressed, elongated, many-seeded, margined on the seed-bearing edge. *Seeds* small, compressed.—Trees and shrubs often with prickly spines for stipules; leaves unequally pinnate; flowers showy, in axillary racemes.

2. *TRIFOLIUM*. *Calyx* tubular or campanulate, five-toothed, persistent. *Petals* more or less united at base, withering or persistent. *Vexillum* reflexed, longer than the oblong alæ; *carina* shorter than the alæ. *Stamens* ten, diadelphous. *Legume* small, membranous, often included in the calyx, one to six-seeded, indehiscent, or opening by one of the sutures; *seeds* roundish.—Tufted or diffuse herbs with leaves mostly

palmately trifoliate; leaflets with straight, scarcely reticulated veins, toothed; flowers in dense heads or spikes.

3. MELLILLOTUS. *Calyx* tubular, five-toothed, persistent. *Corolla* deciduous, keel petals completely united, shorter than the alæ or vexillum. *Stamens* diadelphous. *Legume* ovoid, rugose, coriaceous, longer than the calyx, scarcely dehiscent, one or two-seeded.—Herbs fragrant in drying; leaves pinnately trifoliate; leaflets with simple or forked veins; flowers in racemes.

4. BAPTISIA. *Calyx* four or five-cleft half way, two-lipped, persistent. *Petals* of about equal length, somewhat united; *vexillum* orbicular, emarginate, reflected laterally, not longer than the alæ; *keel-petals* somewhat united. *Stamens* ten, distinct, deciduous. *Legume* ventricose, stipitate, many, or by abortion, few-seeded.—Perennial herbs with palmately trifoliate, rarely simple leaves, which become blackish on drying; flowers generally yellow, rarely white or blue, in racemes.

5. CYTISUS. *Calyx* bilabiate, upper lip generally entire, lower somewhat three-toothed. *Vexillum* ovate, broad; *carina* very obtuse, inclosing the stamens. *Stamens* monadelphous. *Legume* plano-compressed, many-seeded, not glandular.—Shrubs or small trees with ternate leaves, no spines, and yellow, purple, or white flowers.

6. INDIGOFERA. *Calyx* five-cleft, lobes acute. *Vexillum* roundish, emarginate; *carina* with a subulate spur on both sides, at length bending back elastically. *Stamens* diadelphous. *Legume* linear, small, terete or quadrangular, one or more seeded, two-valved. *Seeds* usually truncated, separated by cellular spurious partitions.—Herbs or shrubs, with various leaves, stipules small and free from the petiole; all more or less tomentose or hirsute, with purple, blue, or white racemose flowers.

7. GLYCYRRHIZA. *Calyx* tubular, naked, five-cleft, bilabiate, with the two upper lobes united more than the others. *Vexillum* ovate-lanceolate, straight; *carina* bipetalous or two-parted, straight, acute. *Stamens* diadelphous. *Style* filiform. *Legume* ovate or oblong, compressed, one-celled, one to four-seeded.—Perennial herbaceous plants, generally with sweet roots, unequally pinnated leaves, and blue, white, or violet flowers in axillary racemes.

8. ASTRAGALUS. *Calyx* five-toothed. *Corolla* with an obtuse carina. *Stamens* diadelphous. *Legume* gibbous, of two longitudinal cells or half cells; lower suture turned inward. Plants with pinnate leaves, stipules, and axillary or terminal, often glomerate or spiked flowers.

9. *MUCUNA*. *Calyx* campanulate, bilabiate, the lower lip trifid, the upper entire. *Vexillum* cordate, ascending, shorter than the carina or alæ; *carina* oblong, straight, acute; *alæ* oblong, the length of the carina. *Stamens* diadelphous; *anthers* twenty, five oblong, linear, and five ovate, hirsute. *Legume* oblong, two-valved, with cellular partitions. *Seeds* oval, roundish, or reniform, with a narrow oblong or linear hilum.—Twining plants, with pinnately trifoliate leaves, axillary racemes, and legumes densely covered with sharp, rigid and brittle hairs.

10. *PTEROCARPUS*. *Calyx* five-cleft, somewhat bilabiate. *Petals* five; keel-petals distinct or slightly cohering. *Stamens* ten, variously combined. *Ovary* long stalked. *Legume* indehiscent, irregular, somewhat orbicular, surrounded by a wing, woody, and often rugose in the middle, one to three-celled. *Seeds* one in each cell, reniform.—Unarmed trees or shrubs; leaves unequally pinnated; racemes terminal or axillary; abounding in a red-colored resinous juice, and having an astringent bark.

11. *ANDIRA*. *Calyx* urceolate, five-toothed or entire; teeth nearly equal, acute, erect. *Vexillum* roundish emarginate, longer than the carina. *Ovary* containing three ovules. *Legume* stipitate, roundish, hard, one-celled, one-seeded.

12. *MYROSPERMUM*. *Calyx* campanulate, five-toothed, persistent. *Petals* five, the upper one largest. *Stamens* ten, distinct. *Ovary* oblong, stipitate, membranous, with two to six ovules, and a filiform, lateral style. *Legume* with the stalk naked at base, but winged above, terminating in an oblique, indehiscent, one-celled, one or two-seeded samara. *Seeds* covered with a balsamic juice.—Trees with unequally pinnate dotted leaves, and compressed, membranous legumes.

SUB-ORDER II. *CÆSALPINÆ*.

Corolla not papilionaceous, irregular; petals imbricated in æstivation; the uppermost interior. *Stamens* ten or fewer, all distinct, perigynous.

13. *CASSIA*. *Sepals* five, scarcely united at base, more or less unequal. *Petals* five, unequal. *Stamens* ten, distinct, unequal, and some of them imperfect, spreading; *anthers* opening at apex by two pores or clefts, or by an opening at base; three upper ones often sterile, three lower ones beaked. *Ovary* pedicellate. *Legume* compressed, many-seeded.—Trees, shrubs or herbs, with simply abrupt pinnate leaves; leaflets opposite; petioles often bearing glands; flowers mostly yellow.

14. *TAMARINDUS*. *Calyx* tubular at base; limb bilabiate, reflexed; upper lip three-parted; lower broad, two-toothed. *Petals* three, alter-

nating with the segments of the upper lip of the calyx; two of them ovate, the middle one cucullate. *Stamens* nine or ten; seven very short and sterile; the others longer, monadelphous, bearing anthers. *Style* subulate. *Legume* stalked, linear, more or less curved, slightly compressed, one-celled, three to twelve-seeded, the endocarp pulpy. *Seeds* compressed, bluntly four-angled, obliquely truncated at the hilum.—Trees with abruptly pinnated leaves, and racemose flowers.

15. COPAIFERA. *Calyx* with four sepals united at base, ebracteolate; segments diverging, the lowest the narrowest. *Petals* none. *Stamens* ten, distinct, declinate. *Ovary* roundish, compressed, with two ovules. *Fruit* pedicellate, oblique, obovate, rounded, compressed, between woody and leathery, two-valved, one-seeded. *Seed* inclosed in a one-sided aril.—Trees or shrubs having abruptly pinnate leaves, alternate; leaflets coriaceous, ovate, opposite or alternate, dotted or not, and abounding in a balsamic juice.

16. HÆMATOXYLON. *Sepals* five, united at base into a permanent tube; lobes caducous. *Petals* five, not much longer than the sepals. *Stamens* ten, diadelphous; *filaments* hairy at the base; *anthers* without glands. *Style* capillary. *Legume* compressed, flat, lanceolate, acuminate at each end, two-seeded; the sutures indehiscent, the valves bursting longitudinally.—Trees with the heart-wood of a blood-red color.

SUB-ORDER III. MIMOSEÆ.

Sepals and petals valvate in æstivation, subregular. *Stamens* five to many. Embryo straight. Leaves abruptly pinnate or bipinnate.

17. ACACIA. *Flowers* polygamous, bisexual, and male. *Calyx* four or five-toothed. *Petals* four or five, distinct, or uniting to form a gamopetalous, four or five-cleft corolla. *Stamens* from five to two hundred. *Legume* continuous, dry, two-valved; *seeds* without pulp.—Trees and shrubs unarmed, or armed with stipular thorns or scattered prickles; flowers yellow, white, or rarely red, in globular heads or longish spikes. An ill-defined species, requiring revision.

ORDER XXXVII. ROSACEÆ. ROSE.

Herbs, shrubs or trees, with alternate leaves, and usually large or conspicuous stipules, sometimes none. *Flowers* regular, commonly showy, rarely dicecious. *Sepals* five, rarely fewer, united, often reinforced by as many bracts; the tube lined with a disk, or the orifice surrounded by it. *Petals* five, perigynous, rarely wanting. *Stamens* usually numerous, arising from the calyx, distinct; *anthers* innate, two-celled, dehiscing longitudinally. *Ovaries* superior, one or several,

distinct, one-celled, sometimes forming a many-celled pistil; *ovules* two or more, anatropal, suspended, rarely erect; *styles* lateral; *stigmas* usually simple. *Fruit* either one-seeded, nuts, acini, or follicles containing several seeds. *Seeds* anatropous, exalbuminous.

SUB-ORDER I. ROSACEÆ.

Ovaries solitary or several, distinct; fruit achenia or follicular.

1. *ROSA*. *Calyx-tube*, urceolate, fleshy, contracted at the orifice, limb five-cleft, the segments somewhat imbricated in æstivation, and mostly with a leafy appendage. *Petals* five, multiplied by cultivation, inversely heart-shaped, as long as the calyx and attached to the rim of its tube by broad claws, deciduous. *Filaments* numerous, capillary, shorter than the petals. *Carpels* numerous, oblong, lining the tube of the calyx, interspersed with dense silky hairs; *styles* one to each, lateral, smooth or hairy, all passing through the contracted mouth of the calyx; in some cases united into a cylinder; *stigmas* obtuse. *Fruit* globular or ovate, formed of the permanent, pulpy, colored tube of the calyx, closed at the summit, and containing numerous, oblong, angular, hard, bristly achenia, interspersed with rigid hairs.—Shrubs with pinnated leaves, and large showy flowers; *stipules* mostly adnate to the petiole; prickly.

2. *RUBUS*. *Calyx* concave or flattish at base, five-parted, without bractlets. *Petals* five, deciduous. *Stamens* numerous, inserted in the calyx. *Ovaries* many, with two ovules, one of them abortive. *Achenia* numerous, collected on a conical or oblong, spongy or succulent, receptacle, becoming small drupes; *styles* nearly terminal. *Radicle* superior.—Perennial suffruticose herbs, stems usually biennial, generally prickly; leaves petioled, pinnate, palmate, or simple; fruit edible.

3. *POTENTILLA*. *Calyx* concave, deeply four or five-cleft, with four or five bractlets. *Petals* four or five, obcordate, deciduous. *Stamens* many; *filaments* slender. *Ovaries* collected into a head on a small, dry receptacle; *styles* lateral or terminal, deciduous. *Achenia* numerous; *seeds* suspended.—Herbs or rarely shrubs with pinnately or palmately compound leaves; flowers solitary or racemose, white or yellow, rarely red.

4. *FRAGARIA*. Same as in *Potentilla*. *Receptacle* in fruit much enlarged and conical, becoming pulpy and scarlet, bearing the minute, dry achenia scattered over its surface.—Low perennials with runners; stems stoloniferous; leaves radical, trifoliate; flowers on a scape, white.

5. *GEUM*. *Calyx* sub-campanulate, deeply five-cleft, permanent, with five small alternate bractlets. *Petals* five, obtuse or emarginate,

attached by their claws to the calyx-rim. *Filaments* numerous, awl-shaped, from the rim of the calyx, shorter than the corolla. *Carpels* superior, ovate, compressed, very numerous, in a round head; *styles* long, lateral, with a joint above the middle; lower part permanent; upper deciduous; *stigmas* simple. *Achenia* hairy, each with a long lateral tail, terminating in a hook. *Receptacle* dry, cylindrical, hairy, seated on the permanent reflexed calyx. *Seed* erect.—Perennial herbs, with pinnate or lyrate leaves, white, yellow, or purplish flowers, and somewhat aromatic roots.

6. AGRIMONIA. *Calyx-tube* turbinate, contracted at the throat, armed with hooked bristles above, indurated and inclosing the fruit; the *limb* five-cleft, closed after flowering. *Petals* five, flat, spreading, notched, attached to the rim of the calyx with a small narrow claw. *Stamens* twelve to fifteen; *filaments* capillary, shorter than the corolla. *Styles* lateral, simple, terminal. *Achenia* two, occasionally one or three, ovate, smooth, compressed, pointed, erect, inclosed in the indurated tube of the calyx. *Seed* suspended.—Perennial herbs with interruptedly pinnate leaves, and yellow flowers in long, slender racemes; bracts three-cleft.

7. SPIRÆA. *Calyx* inferior, nearly flat at the base, five-cleft, persistent. *Petals* five, roundish, or oblong, equal. *Stamens* ten to fifty, exserted; *filaments* capillary. *Carpels* five, distinct, rarely coherent at base, sessile, rarely stipitate. *Styles* terminal; *stigmas* spreading, obtuse. *Capsules* five, oblong, pointed, more or less compressed, each of one or two rather membranous valves, one-celled, one to ten-seeded. *Seeds* small, oblong, pendulous from the outer margin of each valve, exalbuminous.—Unarmed herbs or shrubs, with alternate branches and leaves; flowers white or rose-color, rarely yellow or diœcious.

8. GILLENIA. *Calyx* tubular-campanulate, contracted at the orifice, five-cleft; teeth erect. *Petals* five, linear-lanceolate, very long, rather unequal, inserted in the throat of the calyx. *Stamens* ten to twenty, very short; inclosed in the tube. *Carpels* five, connate at base; *styles* terminal, filiform, erect, capitate. *Follicles* five, two-valved, two to four seeded.—Perennial herbs with almost sessile, trifoliate, doubly serrate leaves; flowers white or pale rose-color, loosely paniculate-corymbed.

9. BRAYERA. *Calyx* campanulate; *limb* ten-parted, membranous; half the segments with pinnate veins, and thrice as large as the other five, with three veins each. *Petals* minute, subulate, opposite the larger segments of the calyx. *Stamens* twelve to twenty, short, inserted into the throat of the calyx. *Disk* conical, projecting from the throat of the calyx, and pierced at the apex to allow the styles to pass through.

Ovaries two, stipitate, each with one suspended ovule; *stigmas* dilated, slightly lacerated.

ORDER XXXVIII. DRUPACEÆ. ALMOND.

Trees and shrubs with simple, alternate leaves, glandular toward the base, usually with glandular stipules. *Calyx* five-toothed, deciduous, lined with a disk. *Petals* five, perigynous. *Stamens* fifteen to thirty, inserted on the throat of the calyx. *Anthers* innate, two-celled, dehiscing longitudinally. *Ovary* superior, solitary, simple, one-celled. *Ovules* two, suspended. *Styles* terminal, with a furrow on one side, terminating in a reniform stigma. *Fruit* a drupe, with the putamen sometimes separating spontaneously from the sarcocarp. *Seeds* usually solitary, suspended. *Embryo* straight; *albumen* none.

1. AMYGDALUS. *Calyx* tubular or campanulate, five-cleft, deciduous. *Petals* five, spreading. *Drupe* velvety, compressed, with a separable fleshy epicarp; *stone* or *nucleus* perforate, furrowed, ovate, compressed, one edge acute, the other broad-obtuse.—Trees or shrubs, with leaves conduplicate in æstivation; flowers subsessile, solitary or in pairs, earlier than the leaves, proceeding from scaly buds.

2. PRUNUS. *Calyx* inferior, bell-shaped, deciduous, with five obtuse concave segments. *Petals* five, roundish, concave, spreading, larger than the segments of the calyx. *Filaments* twenty to thirty, awl-shaped, nearly as long as the petals; *anthers* short, of two round lobes. *Ovary* superior, roundish, glabrous, with two pendulous ovules. *Style* filiform, terminal, as long as the stamens; *stigma* orbicular, peltate. *Drupe* ovoid or oblong, fleshy, usually covered with a glaucous bloom. *Nucleus* hard, compressed, smooth, acute, smooth, margins somewhat grooved, of one cell, and two more or less distinct sutures.—Small trees or shrubs, having simple leaves, which are convolute in vernation; fruit edible, and many parts of the tree yielding hydrocyanic acid.

3. CERASUS. Same as Prunus. *Fruit* globose, destitute of bloom; *stone* globose, smooth; *leaves* conduplicate in æstivation.

ORDER XXXIX. POMACEÆ. PEAR.

Trees or shrubs with alternate, simple or compound, stipulate leaves, with edible fruit, and bitter tonic barks. *Calyx* adherent, five-toothed. *Petals* five, unguiculate, inserted in the throat of the calyx; the odd one anterior. *Stamens* indefinite, inserted in a ring in the throat of the calyx. *Disk* thin; *ovaries* one to five, adhering more or less to the sides of the calyx, and to each other; *ovules* usually two, collateral, ascending, rarely solitary, sometimes none; *styles* one to five; *stigmas*

simple. Fruit a pome, one to five-celled, seldom spuriously ten-celled; the endocarp either cartilaginous, spongy, or bony. *Seeds* ascending, solitary, exalbuminous; *embryo* erect.

1. PYRUS. *Calyx-tube* urceolate, superior; *limb* five-cleft, permanent. *Petals* five, roundish, concave, larger than the calyx, and proceeding from its rim, with short claws. *Filaments* twenty, awl-shaped, shorter than the petals, arising from the rim of the calyx; *anthers* oblong, two-lobed. *Ovary* inferior; *styles* two or three to five, filiform, about the length of the stamens; *stigmas* simple, bluntish. *Pome* roundish or somewhat oblong, umbilicated, fleshy, with as many cartilaginous or membranous cells as there are styles. *Seeds* two in each cell, ascending, obovate, flattened at one side; *testa* chartaceous or cartilaginous.

2. CYDONIA. Same as Pyrus. *Cells* of the fruit many-seeded, cartilaginous; *seeds* enveloped in a thick mucilaginous pulp.

ORDER XL. MYRTACEÆ. MYRTLE-BLOOMS.

Trees and shrubs with opposite or alternate entire leaves, generally with transparent dots, and a vein running parallel to their margin; no stipules. *Flowers* red, white, or yellow, never blue. *Calyx* adherent below to the compound ovary, valvate, limb four or five-cleft. *Petals* as many as the calyx-segments, with a quincuncial æstivation; rarely none. *Stamens* indefinite, or twice as many as the petals, rarely equal to them in number; *filaments* distinct, or united in several parcels; *anthers* ovate, two-celled, small, introrse, with a longitudinal dehiscence. *Ovary* inferior, one to six-celled; *style* simple, springing directly from the placenta; *stigma* simple; *ovules* usually pendulous, or erect and anatropal; occasionally peltate and amphitropal, always inserted into a central or axile placenta. *Fruit* dry or fleshy, dehiscent or indehiscent. *Seeds* numerous, variable in form; *embryo* straight or curved, with no albumen.

1. PUNICA. *Tube of the calyx* turbinate; *limb* five to seven-cleft, coriaceous; valvate in æstivation. *Petals* five to seven. *Stamens* numerous; *filaments* distinct; *anthers* anteriorly two-celled, dehiscing by a double chink. *Style* filiform; *stigma* capitate. *Fruit* large, spherical, crowned with the limb of the calyx, baccate, indehiscent, coated with the calyx-tube, unequally divided into two parts by a horizontal diaphragm; the lower division three-celled, the upper five to nine-celled; dissepiments membranous; placenta of upper chamber fleshy, spreading from its sides to the center; those of the lower chamber in irregular processes from its base. *Seeds* very numerous, mixed with a pellucid pulp, exalbuminous; *embryo* oblong; *radicle* short; *cotyledons* straight, foliaceous,

spirally convolute.—Small trees or shrubs with spinescent branchlets, deciduous leaves, and flowers usually scarlet.

2. MYRTUS. *Calyx-tube* somewhat globose; *limb* five or very rarely four-cleft. *Petals* five or very rarely four. *Stamens* distinct. *Berry* two or three-celled, somewhat globose, crowned with the segments of the calyx. *Seeds*, when ripe several in each cell, or very rarely solitary, reniform; *testa* bony. *Embryo* curved; *cotyledons* semicylindrical, very short; *radicle* twice the length of the cotyledons.—Shrubs with opposite, entire, pellucid-dotted, evergreen leaves; peduncles axillary, one or rarely three-flowered.

3. EUGENIA. *Calyx-tube* roundish; *limb* four-cleft. *Petals* four. *Stamens* numerous, distinct. *Berry* nearly globular, crowned by the persistent calyx; one or two-celled, one or two-seeded.

4. MELALEUCA. *Calyx-tube* nearly hemispherical; *limb* five-cleft. *Petals* five. *Stamens* numerous, very long, in five bundles which alternate with the petals; *anthers* incumbent. *Styles* filiform. *Stigmas* obtuse. *Capsule* connate with and inclosed in the thickened tube of the calyx, which is sessile on and adnate at its base to the flower-bearing branch; three-celled, many-seeded. *Seeds* angular.—Trees or shrubs with entire, alternate, or opposite leaves; flowers white, yellowish, or purplish, in spikes or heads; trees furnishing an aromatic volatile oil.

5. CARYOPHYLLUS. *Calyx-tube* cylindrical; *limb* four-parted. *Petals* four, adhering by their ends in a sort of calyptra. *Stamens* distinct, in four parcels, inserted in a quadrangular fleshy hollow near the calyx-teeth. *Ovary* two-celled; *ovules* about twenty in each cell. *Berry* one or two-celled, one or two-seeded. *Seeds* cylindrical, or half ovate; *cotyledons* thick, fleshy, convex externally, sinuous internally.—Trees with opposite, rigid, dotted leaves, and cymose, somewhat corymbose, terminal and axillary flowers.

6. EUCALYPTUS. *Calyx-tube* obovate or globose, cup-shaped, permanent; *limb* entire, resembling a lid, cut all round the base, and deciduous. *Petals* none. *Stamens* numerous, distinct. *Capsule* four-celled, or by abortion three-celled, many-seeded, opening at the apex.—New Holland trees with simple, entire, glaucous leaves, and apetalous flowers; the leaves dotted with numerous vesicles of oil.

ORDER XLI. LYTHRACEÆ. LOOSESTRIFE.

Herbs, rarely shrubs, frequently with four-angled branches, and opposite, verticillate, or alternate, entire, not dotted leaves, without

stipules or glands. *Calyx* tubular, persistent; *limb* four to seven-lobed, sometimes with as many intermediate teeth. *Petals* inserted into the calyx between the lobes, deciduous, sometimes wanting. *Stamens* as many, or two or four times as many as the petals, and inserted below them. *Styles* united into one; *stigma* capitate or rarely two-lobed. *Ovary* superior, inclosed in the calyx-tube, two to four-celled. *Fruit*, a membranous capsule, enveloped in the calyx, usually one-celled by abortion. *Seeds* small, numerous, attached to a central placenta, anatropous, exalbuminous.

1. *LYTHRUM*. *Calyx* cylindrical, striate; *limb* four to six broad teeth, with as many minute intermediate teeth or processes. *Petals* four to six, equal, alternate with the erect teeth of the calyx. *Stamens* as many or twice as many as the petals, inserted at the middle or near the base of the calyx, nearly equal. *Style* filiform; *stigma* capitate. *Capsule* oblong, inclosed in the calyx, two-celled, many-seeded. *Placentæ* thick, adhering to the dissepiment.—Mostly perennials with entire leaves, and white or purple axillary flowers.

ORDER XLII. ONAGRACEÆ. EVENING PRIMROSE.

Herbs, sometimes shrubby, with alternate or opposite *leaves*, not dotted and without stipules. *Flowers* axillary, or in terminal spikes or racemes. *Sepals* four, sometimes two or six, united below into a tube, valvate in æstivation. *Petals* four, sometimes two or six, and, with the four or eight, sometimes one to four stamens, inserted into the throat of the calyx; *pollen* triangular, often cohering by threads. *Ovary* usually four-celled; placenta in the axis. *Styles* united; *stigmas* four, or united into one. *Fruit* generally capsular, sometimes baccate, two to four-celled, many-seeded, exalbuminous.

SUB-ORDER I. ONAGRÆÆ.

Flowers perfect, the parts arranged in fours, rarely threes; pollen connected by threads.

1. *EPILOBIUM*. *Calyx-tube* not prolonged beyond the ovary; *limb* deeply four-cleft, four-parted, and deciduous. *Petals* four. *Stamens* eight; *anthers* short, fixed near the middle; *stigma* often with four spreading lobes. *Ovary* and *capsule* linear, four-cornered, four-celled, four-valved, many-seeded; *seeds* comose, with a tuft of long hairs at the end.—Perennials with nearly sessile leaves, and violet, purple, or white flowers.

2. *ŒNOTHERA*. *Calyx-tube* prolonged beyond the ovary, deciduous; *segments* four, reflexed. *Petals* four, equal, obcordate or obovate,

inserted into the top of the tube. *Stamens* eight, nearly equal. *Ovary* four-celled, with numerous horizontal or ascending ovules. *Stigma* four-lobed or capitate. *Capsule* various in form, four-celled, four-valved, many-seeded; *seeds* naked. Herbs with alternate leaves.

ORDER XLIII. CUCURBITACEÆ. GOURD.

Succulent herbs creeping or climbing by tendrils, with rough, alternate, and palmately-veined leaves. *Flowers* monœcious or polygamous, often monadelphous, never blue. *Calyx* four or five, rarely six, sepals united in a tube, and in the fertile flowers adherent to the ovary. *Petals* as many as sepals, more or less united into a monopetalous corolla which coheres to the calyx, very cellular, and strongly marked with reticulated veins. *Stamens* five, rarely three, inserted into the base of the corolla or calyx, either distinct, or variously united by their filaments and long, contorted *anthers*. *Ovary* inferior, two to five-celled, the thick and fleshy placentæ often filling the cells, or carried back so as to reach the walls of the pericarp, the dissepiments often disappearing during its growth. *Stigmas* thick, dilated, or fringed. *Fruit* a pepo, usually fleshy, with a hard rind; sometimes membranous; often one-celled by obliteration. *Seeds* large, flat, often arilled, anatropous, exalbuminous. *Cotyledons* foliaceous.

1. MOMORDICA. *Flowers* monœcious, yellow or white. Males; *calyx* five-cleft, with a very short tube; *petals* five, united at base; *stamens* five, triadelphous; *anthers* connate. Females; *calyx* and *corolla* as in the males; *filaments* three, sterile; *style* three-cleft; *ovary* three-celled. *Pepo* fleshy, bursting elastically, three-valved; *seeds* compressed, reticulated, with a fleshy arillus.

2. CUCUMIS. *Flowers* monœcious or perfect. *Calyx* tubular-campanulate, with subulate segments scarcely the length of the tube. *Petals* scarcely adhering to each other, five. Males; *stamens* five; triadelphous. Females; *style* short; *stigmas* three, thick, two-lobed. *Pepo* fleshy, indehiscent, three to six celled; *seeds* compressed, ovate, acute, not margined at the edge.—Creeping or climbing plants with axillary, solitary, yellow flowers.

3. CUCURBITA. *Flowers* monœcious; *corolla* campanulate; *petals* united and coherent with the calyx. Males; *calyx* five-toothed; *stamens* five, triadelphous; *anthers* syngeneicous, straight, parallel. Females; *calyx* five-toothed, upper part deciduous after flowering; *stigmas* three, thick, two-lobed. *Pepo* fleshy or ligneous, three to five-celled. *Seeds* thickened at margin, obovate, compressed.—Flowers mostly yellow.

4. CITRULLUS. *Corolla* persistent, five-parted, sub-rotate. *Anthers* triadelphous, bilocular. *Style* trifid. *Stigma* obcordate, convex. *Fruit* a fleshy, or dry and fibrous, many-seeded peponida.

5. ECBALIUM. *Corolla* five or six-cleft; *anthers* triadelphous; *ovules* in two rows in each cell. *Stigmas* three, two-horned. *Fruit* an elastically and irregularly-bursting peponida.

6. BRYONIA. *Flowers* monœcious or diœcious. *Petals* hardly united at the base. Males; *calyx* five-toothed; *stamens* triadelphous; *anthers* flexuose. Females; *style* mostly three-cleft. *Fruit* an ovate or globose, smooth berry, generally few-seeded. *Seeds* ovate, scarcely compressed, more or less edged. *Tendrils* simple, seldom forked.

ORDER XLIV. GROSSULACEÆ. CURRANTS.

Unarmed or spiny shrubs, with alternate, lobed *leaves*, plaited in venation. *Flowers* in axillary racemes with bracts at their base. *Calyx* superior, four or five cleft, regular, colored, marescent, imbricate in æstivation. *Petals* inserted in the throat of the calyx, small, distinct, as many as sepals. *Stamens* as many as petals and alternate with them, very short; *anthers* introrse. *Ovary* one-celled, with two parietal placentæ; *ovules* numerous; *styles* two. *Fruit* a one-celled berry, pulpy, crowned with the remains of the flower. *Seeds* anatropous, the embryo minute, radicle next the micropyle.

1. RIBES. *Calyx* five-lobed, the segments more or less colored. *Petals* five, minute, scale-like. *Stamens* five, distinct, inserted in the throat of the calyx. *Styles* one to four-cleft. *Berry* one-celled, succulent, with narrow parietal placentæ. *Seeds* oblong, slightly compressed.

ORDER XLV. CRASSULACEÆ. HOUSELEEK.

Succulent herbaceous or shrubby plants, with entire or pinnatifid *leaves*, without stipules. *Flowers* sessile, usually in cymes. *Sepals* three to twenty, persistent, more or less united at base. *Petals* as many as the sepals, distinct, rarely cohering, inserted with the distinct *stamens* on the base of the calyx; imbricated in æstivation. *Stamens* as many, or twice as many as the petals, and alternate with them; *anthers* two-celled, bursting lengthwise. *Ovaries* as many as the petals and opposite to them. *Fruit* follicles, as many as ovaries, each opening by the ventral suture, many-seeded. *Seeds* anatropous; embryo surrounded by thin albumen.

1. SEMPERVIVUM. *Calyx* concave, permanent, with from six to twenty, more or less deep, uniform, fleshy, rather acute segments.

Petals as many as calyx-segments, larger, lanceolate, acute, channeled, equal, spreading, withering. A small lacerated *scale* at the base of each carpel. *Filaments* as many or twice as many as the petals, but shorter, awl-shaped, compressed, each terminating in a spreading *style*, with a blunt *stigma*; when ripe bursting along their inner margins.—Perennial herbaceous plants or shrubs, propagated by axillary offsets, with thick, fleshy leaves.

ORDER XLVI. SAXIFRAGACEÆ. SAXIFRAGE.

Herbs or shrubs with alternate or opposite *leaves*, sometimes stipulate. *Sepals* four or five, more or less united, persistent. *Petals* as many as the sepals, inserted between the lobes of the calyx; rarely wanting. *Stamens* mostly five or ten; *anthers* three-celled, opening longitudinally. *Ovaries* inferior, usually of two, sometimes three or four carpels, cohering at base, distinct and divergent above. *Fruit* generally capsular, one or two celled, many-seeded. *Seeds* small, anatropous, with a slender embryo in the albumen.

SUB-ORDER I. SAXIFRAGÆ.

Petals imbricate in æstivation; carpels united, the summits distinct, forming a beaked capsule. Herbs.

1. HEUCHERA. *Calyx* campanulate, cohering at the base with the ovary, five-cleft, segments obtuse. *Corolla* inferior, of five small, entire, erect, spatulate petals, inserted with the five *stamens* on the throat of the calyx. *Styles* two. *Capsule* one-celled, with two parietal adnate placentæ; many-seeded, two-beaked, opening between the beaks.—Perennials, with round cordate, long-petioled, principally radical leaves; those on the scapes, if any, alternate; flowers in panicles on long scapes, greenish-white, tinged with purple; roots astringent.

SUB-ORDER II. HYDRANGÆ.

Petals valvate in the bud; leaves opposite, exstipulate; calyx-tube coherent with the ovary; capsules two-celled. Shrubs.

2. HYDRANGÆA. *Marginal flowers* usually sterile and radiant, consisting of a broad, rotate, membranaceous, four or five-cleft, colored *calyx*, with neither *petals*, *stamens*, nor *styles*. *Fertile flowers*; *calyx-tube* hemispherical, adherent to the ovary, eight or ten ribbed, limb four or five-toothed, persistent. *Petals* four or five, ovate, sessile. *Stamens* eight or ten, slender. *Capsule* crowned by the two diverging styles, opening by a foramen between them, two-celled below, many-seeded.—Shrubs with opposite petioled leaves, and numerous flowers in compound cymes.

ORDER XLVII. HAMAMELACEÆ. WITCH HAZEL.

Shrubs with alternate, simple, dentate *leaves*, the veinlets running direct from the mid-vein to the margin, and deciduous *stipules*. Flowers clustered, often polygamous. *Calyx* cohering with the base of the ovary, four or five-cleft. *Petals*, when present, four or five, linear, with an imbricate æstivation. *Stamens* eight, of which four are alternate with the petals, those opposite barren ; or many, and all fertile with no petals ; *anthers* introrse, two-celled. *Ovary* inferior, two-celled. *Ovules* solitary or several, pendulous or suspended ; *styles* two. *Fruit* semi-inferior, capsular, coriaceous, two-beaked, two-celled ; *cells* one-seeded. *Seeds* pendulous ; *embryo* surrounded by fleshy or horny albumen.

1. HAMAMELIS. *Calyx* four-parted, persistent, with an involucl of two or three bractlets at base. *Petals* four, ligulate, long and narrow. *Stamens* eight, very short ; four alternate with the petals are fertile, the others imperfect and scale-like ; *anthers* introrse, two-celled ; each cell with an operculate valve. *Styles* two, short. *Capsule* coriaceous or bony, two-celled, two-lobed ; *apex* two-valved ; *valves* cleft. The capsule opens loculicidally from the top ; the outer coat separating from the inner, which incloses the seeds, but soon bursts elastically into two pieces. *Seeds* two, arillate.—Tall shrubs or small trees with short petioled, straight-veined leaves, and yellow flowers.

ORDER XLVIII. APIACEÆ OR UMBELLIFERÆ. PARSLEY.

Plants with herbaceous, hollow, furrowed *stems*, and mostly alternate and much divided leaves, with sheathing or dilated petioles at the base. *Flowers* arranged in umbels, mostly white, often yellow, pink, blue, or greenish. *Umbels* usually compound, when the secondary ones are termed *umbellets* ; both often subtended by a whorl of bracts, (*involucre* and *involucels*). *Calyx* adhering to the ovary, entire, five-toothed, or obsolete. *Petals* five, usually inflected at the point, imbricate in æstivation. *Stamens* five, alternate with the petals, and with them inserted on the disk that crowns the ovary, and surrounds the base of the two styles ; *styles* sometimes united and dilated at base (*stylopodium*). *Ovary* inferior, two-celled. *Stigmas* simple. *Fruit* dry, consisting of two indehiscent carpels, (called *mericarps*,) cohering by their inner face, (the *commissure*,) and when ripe separating from each other into two halves, and usually suspended from the summit of a slender prolongation of the axis (*carpopphore*) ; each carpel marked lengthwise with five large ridges, (*primary ribs*,) and often with five intermediate and smaller ones, (*secondary ribs*) ; in the *interstices*, or intervals between the ribs, as well as the commissure, are sometimes contained the (*vittæ*) oil-tubes, which

are little linear canals or receptacles of colored volatile oil. *Seeds* solitary and suspended from the summit of each cell, anatropous, with a minute embryo in hard horn-like albumen.

SUB-ORDER I. ORTHOSPERMÆ.

The inner surface of the seeds and albumen flat or nearly so; *vittæ* often wanting.

1. *SANICULA*. *Flowers* polygamous. *Calyx-tube* echinate; segments acute, leafy, persistent. *Petals* obovate, erect, with a long, inflected point. *Fruit* subglobose, the carpels not separating spontaneously, ribless, thickly clothed with hooked prickles, each with five oil-tubes or *vittæ*.—Perennial herbs with palmately-lobed or parted leaves, those from the root long-petioled. Umbels irregular or compound, the greenish or yellowish flowers capitate in the umbellets, perfect, with staminate ones intermixed; involucre of few, often cleft leaflets; involucl of several, entire.

2. *ERYNGIUM*. *Flowers* sessile, collected in dense heads. *Calyx-tube* rough with scales and vesicles; *teeth* five, leafy. *Petals* erect, connivent, oblong, emarginate, with a long inflexed point. *Styles* filiform. *Fruit* top-shaped, terete, covered with little scales or tubercles, without ribs or *vittæ*; carpophore adnate with the carpels.—Herbaceous or suffruticose plants, chiefly perennials, with coriaceous, toothed, cut, or prickly leaves, blue or white flowers, bracteat; lower bracts involucrate, the others smaller and paleaceous.

3. *CICUTA*. *Calyx-margin* five-toothed, foliaceous. *Petals* obcordate, points inflected. *Fruit* roundish, double, contracted laterally, didymous. *Carpels* with five flattish, equal ribs; the lateral ones marginal; *intervals* filled with single *vittæ*; *commissure* with two *vittæ*; *carpophore* two-parted; *seeds* terete.—Perennial, aquatic, smooth, and poisonous herbs, with taper, fistular stems, and tripinnately or ternately compound leaves; the veins of the lanceolate leaves terminating in the notches; umbels perfect; involucre few-leaved or none; involucl many-leaved; flowers white.

4. *CARUM*. *Calyx-margin* obsolete. *Petals* obovate, emarginate, the point inflexed. *Disk* and *stylopodium* depressed. *Fruit* contracted at the side, ovate or oblong. *Mericarps* with five equal ridges, of which the lateral form the border. *Intervals* with single *vittæ*; *commissure* with two; *carpophore* free, bifid at apex.—Smooth and often perennial herbs, with tuberous, edible roots; leaves pinnated with multifid segments; umbels perfect; involucre various; flowers white.

5. *PIMPINELLA*. *Calyx-margin* obsolete. *Petals* obo cordate, emarginate, with an inflexed lobe. *Flowers* perfect or diclinous. *Fruit* contracted from the side, crowned by a cushion-like disk, and the reflexed, capillary, somewhat capitate styles. *Mericarps* with five, filiform, equal ribs, the lateral of which are on the edge. *Intervals* trivittate; *carpopophore* bifid, free; *seed* convex, anteriorly flattish.—European smooth herbs, often perennial, with compound umbels, white flowers, sometimes pink or yellow, and no involucre.

6. *APIUM*. *Calyx-margin* obsolete. *Petals* roundish, entire, with a small, inflexed point. *Disk* depressed. *Fruit* roundish, laterally contracted, double. *Mericarps* with five filiform equal ribs, the lateral ribs marginal; *dorsal intervals* with single vittæ, *lateral* with two or three; *carpopophore* undivided.—European herbaceous plants with the root thickened at the neck; stem furrowed and branched; leaves pinnated, with wedge-shaped cut segments; umbels perfect, naked; flowers greenish-white.

7. *PETROSELINUM*. *Calyx-margin* obsolete. *Petals* roundish, incurved, scarcely emarginate, with a narrow, inflexed point. *Disk* short, conical, somewhat crenulate. *Styles* diverging. *Fruit* ovate, compressed at the sides. *Mericarps* with five filiform equal ribs, of which the lateral ones form the margin. *Intervals* with single vittæ; *commissure* with two; *carpopophore* biparted. *Involucre* few-leaved; involucels many-leaved.—Smooth branching European herbs, with decom pound leaves, stamens longer than the corolla, and uniform, white or greenish flowers; those of the disk often sterile.

8. *SELINUM*, or *CONIOSELINUM*. *Calyx-teeth* obsolete. *Petals* obovate, with an inflected point. *Fruit* oval, compressed on the back. *Mericarps* with five winged ribs, lateral ones marginal and much the broadest. *Intervals* with one to three vittæ; *commissure* with four to eight.—Smooth biennials, with leaves on very large inflated petioles, and white flowers; involucre scarcely any; involucels five to seven-leaved, awl-shaped.

9. *FÆNICULUM*. *Margin of calyx* tumid, toothless. *Petals* roundish, entire, involute, with a broad, retuse apex. *Fruit* elliptic-oblong, laterally subcompressed. *Mericarps* with five prominent, bluntly-keeled ribs, the lateral ones broader and marginal. *Intervals* univittate; *commissure* bivittate. *Seed* nearly semi-terete.—Biennials or perennials with pinnated, decom pound leaves, and yellow flowers; no involucre nor involucels.

10. *ANGELICA*. *Calyx-margin* obsolete. *Petals* lanceolate, entire, acuminate, with the point straight or curved inward. *Fruit* compressed

at the back, with a central raphe, two-winged on each side. *Mericarps* with three filiform dorsal elevated ribs, the two lateral dilated into a membranous wing. *Intervals* univittate.—Perennials or biennials, with bipinnate leaves, and white flowers; involucre none or few-leaved; involucre many-leaved.

11. ARCHANGELICA. *Calyx-teeth* short. *Petals* elliptical, entire, acuminate, with the point incurved. *Fruit* dorsally compressed. *Mericarps* with three rather thick, carinated, dorsal ribs; lateral ribs dilated into marginal wings. *Seed* not adhering to the integument, covered all over with vittæ.—Perennials, with greenish or white flowers.

12. HERACLEUM. *Calyx-limb* of five, small acute teeth. *Petals* obovate, emarginate, with an inflexed lobe; the outer often radiating and bifid. *Fruit* flattened at the back, surrounded by a broad flat border. *Mericarps* with very fine ribs; the three dorsal equidistant, the two lateral distant from the others, and contiguous to the dilated margin. *Vittæ* solitary in the interstices, generally two on the commissure, all shorter than the fruit, and mostly clavellate.—Large, coarse, herbaceous plants, with many-rayed umbels, large sheathing petioles, and few, deciduous, involucreal leaves.

13. DAUCUS. *Calyx-margin* five-toothed. *Petals* obovate, emarginate, with an inflexed point, the outer usually radiating and bifid. *Fruit* somewhat compressed from the back, ovate or oblong. *Mericarps* with five filiform and bristly primary ribs; the three middle ones at the back, the lateral on the plane of the commissure; the four secondary equal, more prominent, winged, and divided into a single row of prickles. *Intervals* univittate below the secondary ribs; *carpophore* entire, free.—Mostly biennials, with bipinnate leaves; bracts of the involucre multifid and leafy; flowers white or yellowish, the central one usually dark-purple, fleshy and sterile.

14. CUMINUM. *Calyx-teeth* five, lanceolate, setaceous, unequal, persistent. *Petals* oblong, emarginate, erect, spreading, with an inflexed lobe. *Fruit* contracted at the side. *Mericarps* with wingless ribs, the five primary filiform, minutely mucronate, the laterals forming a border; the four secondary more prominent and aculeated. *Intervals* under the secondary ridges with one vitta in each; *carpophore* bipartite.—Annuals, with multifid leaves having setaceous segments; flowers white or pink.

15. OPOPONAX. *Calyx-margin* obsolete. *Petals* roundish, entire, involute. *Stylopodium* broad, thick; *styles* very short. *Fruit* elliptical, compressed, with a dilated margin. *Mericarps* with the three dorsal

ribs thin, prominent, and no distinct, lateral ones. *Vittæ* three to each interval; six to ten to each commissure.—Perennials, with a thick root, and a rough stem; leaves bipinnate; flowers yellow.

16. *FERULA*. *Calyx-margin* with five short teeth. *Petals* ovate, entire, acuminate, with an incurved point. *Fruit* flattened at the back, with a dilated flat border. *Mericarps* with three dorsal filiform ribs, the two lateral obsolete and lost in the dilated margin. *Vittæ* in the dorsal intervals three or more; in the commissure four or more. *Seeds* flat. *Carpophore* bipartite.—Herbaceous plants with fleshy roots, tall smooth stems, and supra-decompound leaves; flowers yellow.

17. *NARTEX*. *Calyx-margin* obsolete. *Petals*? *Stylopodium* plicate-urceolate. *Styles* filiform, finally reflexed. *Fruit* plano-convex, with a dilated border. *Mericarps* with five primary ribs; the three intermediate ones filiform, the two lateral obsolete, immersed in the contiguous margin. *Vittæ* in the dorsal intervals usually single; in the commissure four to six, unequal and variable. *Seeds* flat. *Carpophore* bipartite.

18. *DOREMA*. *Disk* epigynous, cup-shaped. *Fruit* slightly compressed from the back, edged; with three distinct, filiform, primary ribs near the middle, and four obtuse secondary ridges alternating with them; the whole tomentose. *Vittæ*, one to each secondary ridge, one to each primary marginal ridge, and four to the commissure of which two are very small.

19. *GALBANUM*. *Fruit* compressed at the back, elliptical; *ridges* seven, elevated, compressed, bluntly keeled, not winged; the lateral distinct, next the margin. *Channels* broadish, concave, without *vittæ*; commissure flat, dilated, with two broad curved *vittæ*. *Don*.

20. *ANETHUM*. *Calyx-margin* obsolete. *Petals* roundish, entire, involute, with a squarish retuse lobe. *Fruit* lenticular, flattened from the back, surrounded by a flattened border. *Mericarps* with equidistant filiform ridges, the three dorsal acutely keeled, the two lateral more obsolete, losing themselves in the border. *Vittæ* broad, solitary, filling the intervals, two on the commissure.—Upright smooth annuals, with decompound leaves having setaceous linear segments, and yellow flowers.

21. *CENANTHE*. *Calyx* permanent, growing rather larger after flowering. *Petals* obovate, emarginate, with an inflexed lobe. *Disk* conical. *Fruit* cylindrical-ovate, surmounted by long erect styles. *Mericarps* with five convex obtuse ridges, of which the marginal ones are a little the broadest.—Usually aquatic herbs with compound umbels,

and white petals ; flowers of the ray long stalked, abortive ; of the disk sessile or nearly so, and fertile.

22. PEUCEDANUM. *Calyx-margin* five-toothed. *Petals* obovate, contracted into an inflexed segment, emarginate or nearly entire. *Fruit* flattened at the back, surrounded by a dilated flat border. *Mericarps* with equidistant ridges ; the three dorsal filiform, the lateral more obsolete, next the lateral border, or lost in it. *Vittæ* single in the channels, or in the lateral ones, one and a half to two ; usually two on the commissure.—Perennials, generally smooth, with pinnated leaves, more or less compound ; umbels compound, terminal ; flowers white, yellow or yellowish-green.

SUB-ORDER II. CAMPYLOSPERMÆ.

The inner surface of the seed deeply furrowed, or with involute margins.

23. OSMORRHIZA. *Calyx-margin* obsolete. *Petals* oblong, nearly entire, the cuspidate point inflexed ; *styles* conical at base. *Fruit* linear-oblong, clavate, attenuate at base, crowned with the styles. *Carpels* with five equal, acute, bristly ribs ; *intervals* without vittæ ; *commissure* with a deep, bristly channel.—Perennials, with thick aromatic roots, and large two or three ternately compound leaves, with the umbels opposite ; involucre and involucels few-leaved ; flowers white.

24. CONIUM. *Calyx-margin* obsolete. *Petals* obcordate, somewhat emarginate, with a very short inflexed lobe. *Fruit* ovate laterally compressed. *Mericarps* with five prominent, acute, equal, undulate-crenulate ribs, the lateral ones marginal. *Intervals* without vittæ, but with many striæ ; *seeds* with a deep, narrow groove on the face.—Biennials, with fusiform roots, decompound leaves, and white flowers, all fertile. Poisonous herbs.

SUB-ORDER III. CÆLOSPERMÆ.

Seeds incurved at base and apex.

25. CORIANDRUM. *Calyx-teeth* five, acute, unequal, permanent. *Petals* obovate, emarginate, with an inflexed segment, the exterior radiating and bifid. *Fruit* globose, with ten ribs, scarcely separating. *Mericarps* with five depressed, primary ribs, wavy, and four secondary ones, beside the marginals, more prominent and keeled. *Intervals* without vittæ ; *commissure* with two. *Seed* excavated in front, with a loose skin.—A smooth annual, with multifid leaves, three to five-rayed umbels, and no involucre ; involucels three-leaved, unilateral.

ORDER XLIX. ARALIACEÆ. SPIKENARD.

Herbs, shrubs or trees, with the habit of umbellifers. *Leaves* exstipulate, simple, or compound, the petioles thickened and dilated at base. *Flowers* usually umbellate. *Calyx* adherent to the ovary, entire or toothed. *Petals* five to ten, deciduous, rarely wanting, valvate in æstivation. *Stamens* equal in number to the petals, rarely double the number, alternate with them, and inserted with them on the top of the ovary. *Anthers* introrse. *Ovaries* crowned with a disk, two or many-celled; *ovules* solitary; *styles* as many as cells; *stigmas* simple. *Fruit* baccate or drupaceous, sometimes nearly dry, but the carpels adherent. *Seed* solitary in each cell. *Embryo* short, at the base of the copious, fleshy albumen.

1. ARALIA. *Flowers* mostly perfect; *calyx-limb* short, entire, or five toothed. *Petals* five, spreading, apex not inflexed. *Stamens* five or ten, alternate with the petals; *filaments* short. *Styles* five, spreading. *Fruit* a berry or drupe, five-lobed, five-celled, five-seeded, crowned with the remains of the calyx and styles. *Stones* papery.—Shrubs, low trees or perennial herbs, with compound leaves, and greenish-white flowers, in simple, solitary or racemose panicles.

2. PANAX. *Flowers* dioeciously polygamous. Perfect flowers; *calyx* adnate to the ovary, limb short, obsoletely five-toothed; *petals* five; *stamens* five, alternate with the petals; *styles* two or three, short; *fruit* baccate, succulent, compressed, orbicular, two or three-celled; cells one-seeded, leathery. Sterile flowers; *calyx-limb* nearly entire; petals and stamens five.—Chiefly perennial herbs with greenish-white flowers, in a solitary, simple umbel; only three stem leaves in a whorl, in the herbaceous.

3. HEDERA. *Calyx* an elevated or five-toothed edge. *Petals* not five, not calyptrate and cohering, dilated at the base. *Stamens* and *styles* five to ten, the latter converging or consolidated. *Berry* five-seeded, crowned by the persistent calyx.—European shrubby plants, climbing or erect, with simple, evergreen leaves, and green flowers.

ORDER L. CORNACEÆ. DOGWOOD.

Trees and shrubs, rarely herbs, with a bitter bark, and simple, mostly opposite and entire *leaves*, with pinnate veinlets, exstipulate; in one species alternate. *Hairs* fixed by the center. *Flowers* cymose and sometimes involucrate. *Sepals* adherent to the ovary; the *limb* minute, four or five-toothed or lobed. *Petals* four or five, distinct, alternate with the calyx-teeth; æstivation valvate. *Stamens* four or five, inserted with

the petals and alternate with them. *Ovary* one or two-celled. *Styles* single. *Fruit* a baccate drupe, with a one or two-celled nucleus, crowned with the calyx. *Seeds* two, anatropous; *embryo* nearly the length of the fleshy albumen.

1. CORNUS. *Calyx-limb* minutely four-toothed. *Petals* four, oblong, sessile, spreading. *Stamens* four; *filaments* slender. *Style* one, sub-clavate; *stigma* obtuse or capitate. *Drupe* baccate, not connate, with a two or three-celled nut. *Seeds* solitary, pendulous. *Albumen* fleshy; *radicle* of the embryo shorter than the cotyledons.—Trees, shrubs, or perennial herbs, with entire, mostly opposite leaves, and whitish flowers in cymes.

ORDER LI. LORANTHACEÆ. MISTLETOE.

Shrubby plants with parasitical, dichotomous stems, and coriaceous, opposite, fleshy, evergreen leaves, without stipules. *Flowers* small and dioecious, whitish or greenish-yellow, sometimes perfect and brilliant. *Calyx* adnate to the ovary in perfect flower; *limb* three to five-cleft or obsolete. *Petals* three, four, or eight, united in a tube, sometimes distinct, inserted into the epigynous disk. *Stamens* as many as the petals and opposite to them, or to the sepals when the petals are wanting. *Ovary* one-celled, with a single, suspended ovule; *style* simple or none. *Fruit* baccate, with one anatropous seed.

1. VISCUM. *Flowers* monœcious or dioecious. Males; *calyx* with from three to five, usually four triangular, erect segments, valvate in æstivation. *Anthers* as many as the sepals, and inserted on them. *Petals* none. Females; *calyx-limb* obsolete. *Petals* four, fleshy, epigynous. *Stamens* none; *stigma* sessile. *Berry* fleshy, one-seeded.—Leaves very rarely alternate or scale-like.

SUB-CLASS II. MONOPETALOUS PLANTS.

Floral envelops consisting of both calyx and corolla; the latter composed of petals more or less united, or monopetalous.

ORDER LII. CAPRIFOLIACEÆ. HONEYSUCKLE.

Shrubs, rarely herbs, often twining, with opposite leaves and no stipules. *Flowers* cymose and often fragrant. *Calyx* adherent to the ovary; *limb* five, rarely four-toothed. *Corolla* tubular or rotate, regular or irregular, imbricate in æstivation. *Stamens* as many, or one less than the lobes of the corolla, alternate with them, and inserted into the tube. *Anthers* introrse, versatile. *Ovary* three, rarely four or five-celled, with one to several pendulous ovules in each cell. *Style* one, filiform, with a somewhat capitate stigma, or wanting. *Stigmas* one to

four. *Fruit* baccate, fleshy, or sometimes dry, sometimes one-celled by abortion. *Seeds* anatropous. *Embryo* in the axis of the fleshy albumen.

SUB-ORDER I. LONICERÆÆ.

Corolla tubular; the limb often irregular; style filiform; stigma capitate.

1. DIERVILLA. *Calyx-tube* oblong, tapering at the summit; *limb* five-cleft; *lobes* slender, awl-shaped, persistent. *Corolla* twice as long as the calyx, funnel-form, five-lobed, almost regular. *Stamens* five. *Pod* ovoid-oblong, pointed, two-celled, two-valved, septicidal, many-seeded.—Low upright shrubs with opposite, serrate, deciduous leaves, and flowers in axillary or terminal cymose peduncles.

2. TRIOSTEUM. *Calyx-tube* ovoid; *limb* five-parted; *lobes* linear, nearly as long as the corolla, persistent. *Corolla* tubular, gibbous at base, five-lobed, sub-equal, scarcely longer than the calyx. *Stamens* five, included. *Stigma* capitate, lobed. *Fruit* drupaceous, rather dry, crowned with the calyx, three-celled, three-seeded; *seeds* ribbed and bony.—Coarse hairy perennial herbs, leafy to the top, with the ample entire pointed leaves tapering to the base, but connate round the simple stem; flower sessile, and solitary, or clustered in the axils.

SUB-ORDER II. SAMBUCEÆ.

Corolla regular, rotate, deeply five-lobed. *Stigmas* three, rarely five, sessile. Flowers in cymes.

3. SAMBUCUS. *Calyx-limb* small, five-cleft. *Corolla* rotate or urceolate, five-cleft, segments obtuse. *Stamens* five. *Stigmas* three, sessile, obtuse, small. *Fruit* baccate, pulpy, subglobose, three or four-seeded, hardly crowned by the remains of the calyx.—Shrubs or perennial herbs with opposite pinnate or bipinnate leaves, and numerous, small, white or reddish flowers in compound cymes.

4. VIBURNUM. *Calyx* small, five-toothed, persistent. *Corolla* spreading; *limb* five-lobed, segments obtuse. *Stamens* five, equal, longer than the corolla. *Stigmas* three, mostly sessile. *Drupe* one-celled, one-seeded, with thin pulp, and a crustaceous flattened stone.—Shrubs with simple petioled leaves, and white sessile flowers in flat, compound cymes, sometimes radiant.

ORDER. LIII. RUBIACEÆ. MADDER.

Herbs, shrubs, or trees, with angular stems and opposite, entire, sometimes verticillate leaves; stipules between the petioles, somewhat

resembling the leaves. *Calyx-tube* more or less adherent; *limb* five-cleft. *Corolla* monopetalous, valvate, rotate, or tubular, inserted on the calyx; *lobes* equal in number to those of the calyx. *Stamens* as many as corolla-segments, alternate with them, and inserted upon the corolla-tube. *Ovary* peltate, or two-celled. *Ovules* solitary, erect. *Styles* two; *stigma* simple. *Fruit* various. *Seeds* anatropous or amphitropous, with copious hard albumen.

SUB-ORDER I. STELLATÆ.

Calyx wholly adherent to the ovary, which is two-celled, two-seeded. Leaves verticillate, with apparently no stipules. *Calyx* valvate in æstivation.

1. RUBIA. *Calyx-tube* ovate, globose; *limb* almost wanting. *Corolla* rotate, five-parted. *Stamens* five, short. *Styles* two, short. *Fruit* didymous, globose, baccate, juicy.—Herbaceous or shrubby plants with square stems, verticillate leaves, and small, white, or ochroleucous flowers.

2. GALIUM. *Calyx* minute, four-toothed. *Corolla* rotate, four-parted, rarely three. *Stamens* four, rarely three, short. *Styles* two. *Fruit* dry, or a little fleshy, globular, twin, separating when ripe into the two seed-like, indehiscent, one-seeded carpels.—Slender herbs with square stems, whorled leaves, and small cymose flowers.

SUB-ORDER II. CINCHONÆ, OR MITCHELLÆ.

Calyx adherent to the ovary. Leaves opposite, rarely verticillate, with stipules between the petioles, often united with them into a sheath.

3. MITCHELLA. *Flowers* two on each double ovary. *Calyx* four-parted. *Corolla* funnel-form, four-lobed; *lobes* spreading, densely bearded within. *Stamens* four, short, inserted on the corolla. *Style* slender; *stigmas* four. *Fruit* a dry berry-like double drupe, crowned with the calyx-teeth of the two flowers, each containing four small and seed-like bony nutlets.—Smooth and creeping evergreen herbs, with round-ovate, petiolate leaves, minute stipules, white fragrant flowers often tinged with red, and bright scarlet dry berries, which remain over winter. Parts of the flower occasionally in threes, fives, or sixes.

4. CEPHALANTHUS. *Calyx-tube* inversely-pyramidal; *limb* four-toothed. *Corolla* tubular, slender, four-cleft; *lobes* erect, with a valvate æstivation. *Stamens* four, somewhat exserted. *Style* filiform, very long,

with a capitate *stigma*. *Fruit* dry and hard, inversely pyramidal, two to four-celled, separating from the base upward into two to four closed one-seeded portions. *Seeds* with a rind or corky arillus.—Shrubs with oval or lanceolate, opposite or ternate leaves, furnished with short stipules, and white flowers densely aggregated in spherical peduncled heads.

SUB-ORDER III. SPIGELIÆ or LOGANIÆ.

Calyx persistent, almost entirely free from the ovary; corolla not convolute in æstivation. Leaves opposite, with intermediate stipules, united with the petioles.

5. SPIGELIA. This is placed by some authors in the order Gentianaceæ, and by others in Loganiaceæ. *Calyx* inferior, deeply five-cleft, persistent; *segments* linear-subulate. *Corolla* tubular-funnel form, much longer than the calyx, narrowed at base; *limb* spreading, five-cleft; *segments* broad, acuminate; valvate in æstivation. *Stamens* five, simple; *anthers* simple, linear, converging. *Ovary* superior; *style* single, slender, hairy above, as long as the corolla, jointed near the middle; *stigma* simple. *Capsule* didymous, two-celled, four-valved. *Seeds* few or many, minute.—Shrubs or chiefly herbs with opposite and often connate leaves on the lower part of the stem, and quaternate above; flowers of a blue or red color, mostly sessile, and in one-sided terminal cymes or spikes.

ORDER LIV. CINCHONACEÆ. CINCHONA.

The plants which I have placed under this order, are arranged by many authors in the preceding one, in Cinchoneæ; but as others have arranged them again in several different orders, I have deemed it best to make the present division, especially as it is in accordance with the views of several eminent botanists, among whom may be named Lindley. In many respects it resembles the preceding order.

A very extensive order of trees, shrubs, or herbs, with simple, entire, opposite or verticillate leaves having interpetiolar stipules. *Flowers* usually in corymbs or panicles. *Calyx* adherent, with a definite number of divisions, or none. *Corolla* superior, regular, tubular; *divisions* definite; æstivation valvate or imbricate. *Stamens* inserted on the corolla, and alternate with its lobes. *Ovary* inferior, crowned with a disk, usually two-celled, sometimes with several; *ovules* numerous, attached to a central placenta, or few and erect, or ascending. *Style* single, sometimes partly divided. *Stigma* commonly simple, occasionally divided. *Fruit* inferior, either dividing into two cocci, or indehiscent and dry or succulent, sometimes with several cells. *Seeds* definite or numerous. *Embryo* small, oblong, surrounded by a horny albumen.

SUB-ORDER I. CINCHONEÆ.

Leaves opposite; stipules interpetiolar; fruit capsular, two-celled; cells many-seeded; seeds winged; albumen fleshy. Trees or shrubs.

1. CINCHONA. *Calyx* persistent, five-toothed. *Corolla* with a terete tube; *limb* hypocrateriform, five-parted, valvate in æstivation. *Stamens* inserted in the middle of the tube; *filaments* short; *anthers* linear, included. *Capsule* ovate or oblong, dividing along the dissepiment into two carpels, open at the commissure, and crowned by the persistent calyx. *Seeds* many, with a membranaceous lacerated wing or margin; *albumen* fleshy.—Trees and shrubs with white or reddish flowers. South American. Variouslly arranged by botanists, according to the character of the corolla-limb, and leaves.

2. UNCARIA. *Limb of calyx* short, urceolate, five-cleft. *Corolla* funnel-shaped; *tube* slender; *throat* naked; *lobes* five, spreading, oval-oblong. *Anthers* inclosed or protruded. *Style* filiform, protruded; *stigma* tumid, undivided. *Capsules* pedicellate, clavate, tapering to the base. *Seeds* numerous, imbricated, winged.—Climbing shrubs. Exotics.

SUB-ORDER II. COFFEEÆ.

Fruit two-celled, berried, with two bony or crustaceous one-sided nuts, which are flat and furrowed in the inside; or occasionally by abortion, having but one nut, and then the seeds are erect, depressed, or laterally adherent. Albumen horny. Leaves opposite. Stipules interpetiolar, united or distinct.

3. CHIOCOCCA. *Calyx-limb* five-toothed. *Corolla* funnel-shaped, with an obconical tube or throat, and a five-lobed acute limb. *Stamens* five, downy, hardly adnate to the base of the corolla; *anthers* linear, included. *Style* single, with the apex sub-clavate or sub-bilobed. *Berry* somewhat didymous, small, roundish, compressed, crowned with the persistent calyx; two-celled, two-seeded. *Seeds* pendulous, compressed, roundish.—Shrubby, somewhat climbing plants, with yellowish-white flowers. Exotic.

4. COFFEA. *Calyx-tube* ovate, globose or turbinate; *limb* small, four or five-toothed. *Corolla* tubular, funnel-form, with a dilated four or five-parted limb, with oblong lobes. *Stamens* four or five, included or exerted. *Style* bifid at the apex. *Berry* umbilicate, naked, or crowned with the calyx, containing two seeds inclosed in a parchment-like putamen. *Seed* convex above, flat beneath, with a longitudinal furrow.—Shrubs or trees with opposite, stipulate leaves.

5. *CEPHAËLIS*. *Heads of flowers* inclosed in a large two to eight-leaved involucre. *Calyx-tube* obovate; *limb* very short, five-toothed. *Corolla* somewhat funnel-shaped, five-parted; *segments* small, obtuse. *Anthers* included. *Stigma* bifid, often exserted. *Fruit* an obovate-oblong berry, crowned with the remains of the calyx, two-celled, two-seeded.—Shrubs and herbs of S. America; imperfectly known.

ORDER LV. VALERIANACEÆ. VALERIAN.

Herbs with opposite *leaves* and no stipules. *Flowers* generally in cymes or panicles. *Calyx-tube* coherent with the ovary; *limb* two to four-toothed, obsolete, or else either membranous, or resembling a pappus. *Corolla* tubular or funnel-form, sometimes with a spur at base, four or five-lobed. *Stamens* distinct, usually fewer than the lobes of the corolla, alternate with them and inserted into the corolla-tube. *Ovary* inferior, with one perfect cell, and two abortive ones. *Seeds* solitary, pendulous, in a dry, indehiscent pericarp, anatropous, with a large embryo, and no albumen.

1. *VALERIANA*. *Calyx-limb* involute during flowering, then unrolled into a deciduous, feathery pappus, consisting of many plumose bristles. *Corolla-tube* obconical or cylindrical, equal at the base or gibbous, but without a spur; *limb* bluntly five, rarely three-cleft. *Stamens* three. *Fruit* indehiscent, one-celled, one-seeded.—Perennial herbs with deep and thickened, strong-scented roots, and opposite, simple or pinnate leaves; flowers in close cymes.

ORDER LVI. ASTERACEÆ or COMPOSITÆ. ASTERS.

Herbaceous or shrubby plants with alternate or opposite *leaves*, without stipules, simple though often much divided. *Flowers* collected into a dense head (*capitulum*), upon a common receptacle, surrounded by an involucre of many bracts or scales, (*paleæ*). *Calyx-limb* obsolete, or membranaceous, consisting of bristles, awns, scales, teeth, hairs, etc., called *pappus*; *tube* adherent to the ovary. *Corolla* mostly of five united petals, superior, ligulate or tubular, valvate in æstivation, the veins bordering the margins of the lobes. *Stamens* five, rarely four, inserted on the corolla, and alternate with its lobes; *filaments* distinct, or united above; *anthers* linear, cohering into a cylinder, (*syngenesious*). *Ovary* inferior, one-celled, one-ovuled. *Style* two-cleft at the apex, usually undivided in sterile flowers; the inner margins of the branches occupied by the *stigmas*. *Fruit* a dry, indehiscent, one-seeded pericarp (*achenium*), crowned with the limb of the calyx or pappus. *Seed* erect, anatropous, without albumen.—A very extensive family, chiefly herbs in temperate regions, with perfect, polygamous, monœcious, or diœcious flowers.

SUB-ORDER I. TUBULIFLOREÆ.

Corolla of the perfect or disk flowers tubular, regular, the limb five-lobed, rarely four; the ligulate or ray flowers, when present, either pistillate only, or neutral (with neither stamens nor pistil), and occupying the border.

TRIBE I. VERNONIACEÆ. IRONWEED.

Heads discoid; the flowers all alike, perfect, tubular. Branches of the style slender, filiform, acute, hairy all over, the stigmatic lines only on the lower part. Corolla often slightly irregular.

1. *VERNONIA*. *Flowers* all tubular; *heads* few or many-flowered, in corymbose cymes. *Involucre* semicylindric, of ovate, imbricated scales, shorter than the florets, with the inner scales longest. *Receptacle* naked, or rarely honeycombed and fringed. *Corolla* regular, five-cleft with the lobes in the entire part nearly equal. *Filaments* smooth. *Achenium* with a cartilaginous callus at the base, and a large epigynous disk. *Pappus* usually in two rows, of which the inner is bristly, and much longer than the outer which is paleaceous or chaffy; rarely in two equal rows.—Perennial herbs or shrubs, mostly with alternate leaves.

TRIBE II. EUPATORIACEÆ. EUPATORIUM.

Heads discoid or radiate. Branches of the style much elongated, obtuse, or club-shaped, minutely pubescent above on the outside; the stigmatic lines obscure within, below the middle. Anthers not caudate. Leaves mostly opposite.

SUB-TRIBE I. EUPATORIÆ.

Heads discoid, homogamous; flowers seldom yellow.

2. *LIATRIS*. *Flowers* all tubular; *heads* five to thirty-flowered. *Scales of involucre* few or numerous, oblong, imbricate, appressed. *Receptacle* naked. *Corolla* five-lobed, lobes all slender, long. *Branches of style* much exserted, cylindrical, obtuse. *Achenium* about ten-ribbed, nearly terete, tapering to the base. *Pappus* in one to three rows of fifteen to forty plumose or barbellate bristles.—Perennial herbs with tuberous roots, simple wand-like stems, alternate leaves, and cyanic flowers.

3. *EUPATORIUM*. *Corolla* tubular, five-toothed. *Heads* three to many-flowered. *Involucre* cylindrical or campanulate, the scales imbricated in two, three, or more series, equal or unequal, loosely or closely imbricated; sometimes only in a single series. *Receptacle* flat, naked. *Anthers* included. *Branches of style* mostly exserted and elongated,

cylindrical, obtuse. *Achenia* five-angled, without intermediate striæ. *Pappus* a single row of slender, capillary, barely roughish bristles.—Perennial herbs with opposite or verticillate leaves, often covered with resinous dots, and cyanic flowers in corymbose heads.

SUB-TRIBE II. TUSSILAGINEÆ.

Head-flowers dissimilar or dioecious; the pistillate often ligulate.

4. TUSSILAGO. *Heads* many-flowered, heterogamous; *ray-florets* in many rows, pistillate, narrowly ligulate; *disk-florets* tubular, few, staminate, with a five-toothed limb. *Receptacle* naked. *Anthers* scarcely caudate. *Scales of involucre* oblong, obtuse, nearly in a single row. *Styles of the disk* included, sterile; *of the rays* bifid, with terete branches. *Achenia of the ray* oblong, cylindrical, smooth; *of the disk* abortive. *Pappus* of the ray-florets in several rows; of the disk, in one series, capillary.—Perennials with radical leaves, and yellow flowers with narrow rays.

TRIBE III. ASTEROIDEÆ. ASTER.

Heads radiate, rarely discoid. Style of perfect flowers cylindrical; branches more or less flattened; mostly linear or lanceolate above, equally pubescent above outside; conspicuous stigmatic lines, terminating where the exterior pubescence commences, not confluent. Leaves alternate, rarely opposite.

SUB-TRIBE I. ASTERINEÆ.

Heads with the flowers all alike and perfect, or with ligulate rays; receptacle not chaffy; anthers without tails at base.

5. ASTER. *Heads* many-flowered; *ray-flowers* in a single series, fertile. *Involucre* oblong, imbricate; *scales* loose, often with green leaf-like tips, the outer spreading; *disk-flowers* tubular, perfect. *Receptacle* flat, alveolate. *Achenia* usually more or less compressed. *Pappus* simple, of rough, capillary bristles.—A large genus of perennial, rarely annual herbs, with alternate leaves, and corymbed-panicled, or racemose heads. Ray-flowers white, purple, or blue; those of the disk yellow, often changing to purple.

6. ERIGERON. *Heads* many-flowered, subhemispherical; *ray-flowers* numerous, in several series, narrow, linear, pistillate; *disk-florets* tubular, perfect; some of the external ones filiform-tubular and truncate, pistillate. *Receptacle* flat, naked, dotted with the sockets of the florets fringed. *Scales of the involucre* nearly equal, narrow, in almost a double series. *Appendages of the style* short and obtuse. *Achenia* compressed, usually pubescent and two-nerved. *Pappus* a single row of capillary bristles.

with minuter ones intermixed, or with a distinct short outer pappus of little bristles or chaffy scales.—Herbs with alternate leaves and cyanic ray-flowers.

SUB-TRIBE II. SOLIDAGÆ.

Heads radiate ; rays yellow, rarely yellowish-white.

7. *SOLIDAGO*. *Heads* few, many-flowered, radiate ; *ray-flowers* about five, pistillate, in one row, often wide apart ; *disk-florets* tubular, five-toothed, perfect. *Scales of the oblong involucre* imbricated, appressed, without foliaceous or herbaceous tips. *Receptacle* narrow, usually alveolate. *Achenia* many-ribbed, rather terete. *Pappus* simple, of numerous scabrous capillary bristles.—Perennial herbs, with erect wand-like stems, alternate, subsessile cauline leaves, the radical ones never cordate, and yellow flowers in terminal or axillary racemes or clusters. In one species the flowers are whitish.

8. *INULA*. *Heads* many-flowered, heterogamous ; *ray-florets* in one row, pistillate, sometimes sterile by abortion, usually ligulate, rarely somewhat tubular and trifid ; *disk-flowers* perfect, tubular, five-toothed. *Involucre* imbricated in several rows. *Receptacle* flat, or somewhat concave, naked. *Anthers* with two setæ at the base. *Achenium* without a beak, tapering or angled. *Pappus* uniform, in one row, composed of scabrous, capillary bristles.—Perennial herbs with alternate leaves and yellow flowers.

TRIBE IV. SENECTIONIDÆ. GROUNDSEL.

Heads radiate or discoid. Branches of the style linear, hairy, or hispid at the apex, which is either truncated, or produced into a conical or elongated appendage. Leaves opposite or alternate.

SUB-TRIBE I. SENECTIONEÆ.

Pappus soft and capillary. Anthers not caudate ; receptacle naked. Heads radiate or discoid.

9. *ARNICA*. *Heads* many-flowered, radiate ; *ray-florets* pistillate and often furnished with sterile stamens ; *disk-florets* tubular, perfect, five-toothed. *Scales of the bell-shaped involucre* lanceolate, equal, somewhat in two series. *Receptacle* flat, fringed or hairy. *Corolla-tube* shaggy ; *style of the disk* with long pubescent branches, either truncated or terminated by a short one. *Achenia* terete, fusiform, somewhat ribbed and hairy. *Pappus* a single row of rather rigid barbellate, or strongly scabrous capillary bristles.—Perennial herbs, chiefly of cold regions or mountains, with simple stems, opposite leaves, and yellow flowers.

10. *SILPHIUM*. *Heads* many-flowered; *ray-florets* numerous, pistillate, fertile, their broad flat ovaries imbricated in two or three rows; *disk-florets* perfect, but sterile. *Involucre* campanulate; *scales* in several series, imbricated, leafy and spreading at the summit, except the innermost, which are small and resemble the linear chaff of the flat *receptacle*. *Achenia* broad, flat, parallel with the involucreal scales, surrounded by a wing which is notched at the top, destitute of pappus, or with two teeth confluent with the winged margin; achenia of the disk sterile and stalk-like.—Stout, coarse, and tall perennial herbs, with a copious resinous juice, and large corymbose-panicled, yellow-flowered heads.

11. *PARTHENIUM*. *Heads* many-flowered; *ray-florets* five, somewhat ligulate, fertile; *disk-florets* tubular, sterile. *Involucre* hemispherical; *scales* in two series, outer ones ovate, inner orbicular. *Receptacle* conical, chaffy. *Achenia* five, compressed, cohering with two contiguous paleæ.—American perennial herbs with alternate leaves.

12. *RUBBECKIA*. *Heads* many-flowered; *ray-florets* neutral. *Scales of the involucre* nearly equal, leafy, in two rows of six each, spreading. *Disk-florets* perfect. *Receptacle* conical or columnar, with short, unarmed, concave chaff. *Achenia* quadrangular, smooth, not margined, flat at the top, with no pappus, or a minute crown-like border, four-toothed.—Chiefly perennial herbs, with alternate leaves, large terminal heads, and generally drooping, yellow rays.

13. *ECHINACEÆ*. *Heads* many-flowered; *ray-florets* very long, drooping, pistillate, but sterile; *disk-flowers* perfect, fertile. *Scales of the involucre* imbricated in two rows, lanceolate, spreading. *Receptacle* conical; the lanceolate chaff tipped with a cartilaginous point, longer than the disk-flowers. *Achenia* thick and short, four-sided. *Pappus* a small crown-form toothed border.—Perennials with stout and nearly simple stems, leaves three to five-nerved, chiefly alternate; ray-flowers rose-purple, pendulous, rather persistent; disk-flowers purplish.

14. *HELIANTHUS*. *Heads* many-flowered; *ray-flowers* several or many, neutral; *disk-flowers* perfect, fertile. *Scales of the involucre* imbricated in several series; *receptacle* flattish or convex, the chaff persistent, embracing the achenia. *Pappus* very deciduous, of two thin chaffy-awned scales on the principal angles of the achenium, and often two or more little intermediate scales. *Achenia* compressed laterally, or four-sided, neither winged nor margined.—Coarse and rough herbs, mostly perennial, often exuding a resin, with opposite leaves, the upper often alternate, mostly tripli-veined, with solitary or corymbed heads and yellow rays; disk yellow or purple. *H. Annuus* is annual.

15. HELENIUM. *Heads* many-flowered, radiate; *ray-florets* in a single series, pistillate, cuneiform, ligulate, three to five-cleft at summit, with scarcely any tube, fertile; *disk-florets* with a short tube, and an inflated, cylindrical, four or five-toothed limb. *Scales of the involucre* in a double series; the outer linear or subulate, foliaceous, spreading or relaxed; the inner few and shorter, chaffy. *Receptacle* convex, globose, or oblong, naked in the disk, and chaffy in the ray only. *Branches of the style* a little dilated and obtuse at tip. *Achenia* obovate-turbinate or top-shaped, striate or ribbed, villous on the ribs. *Pappus* of five to eight membranous, apiculate, or awned scales.—Plants with alternate, decurrent leaves, minutely punctate, and yellow ray-flowers.

16. ANTHEMIS. *Heads* many-flowered; *florets of the ray* in one row, ligulate, fertile, rarely none or somewhat tubular; *disk-florets* perfect, tubular, five-toothed. *Scales of the involucre* imbricated in a few series. *Receptacle* convex, oblong, or conical; covered with membranous chaff between the flowers. *Branches of the style* without appendages at the apex. *Achenia* terete, or obtusely quadrangular, striate, smooth. *Pappus* either wanting, or a very minute entire or halved membrane, sometimes auriculate at the inside.

17. MARUTA. *Heads* many-flowered; *ray-florets* ligulate, neutral; *disk-florets* five-toothed, perfect, fertile. *Involucre* hemispherical, shorter than the disk; *scales* imbricated in a few series. *Receptacle* conical or convex, more or less chaffy between the flowers, or only at the summit. *Tube of corolla* flat, obcompressed, two-winged, without appendage at the base; that of the ray continuous with the sterile ovary, and with an oblong ray. *Style of the disk* with branches destitute of appendages. *Achenia* obovoid or obpyramidal, ribbed, smooth, bald, with a small epigynous disk, and a terminal areola.—Annual acrid herbs, with a strong odor, alternate and much divided leaves, white rays, turned down, and yellow disk.

18. ACHILLEA. *Heads* many-flowered; *rays* few, fertile. *Involucre* ovoid; *scales* unequal, imbricated. *Receptacle* flat, sometimes elongated, chaffy. *Achenia* oblong, obcompressed, margined, destitute of pappus.—Perennial herbs, with much divided, alternate leaves and small corymbose heads.

19. ANACYCLUS. *Heads* many-flowered; *ray-florets* pistillate, sterile, somewhat ligulate, rarely tubular; *disk-florets* perfect, five-toothed. *Receptacle* conical or convex, chaffy. *Involucre* in few rows, subcampanulate, shorter than the disk. All the florets with an obcompressed, two-winged, exappendiculate tube. *Style of the disk* with exappendiculate

branches. *Achenia* flat, obcompressed, with broad, entire wings. *Pappus* short, irregular, toothed, somewhat continuous with the wings on the inner side.—A small genus separated from *Anthemis*, to which it is very closely allied.

20. *LEUCANTHEMUM*. *Heads* many-flowered; the *rays* numerous, fertile; disk-corollas with a flattened tube. *Scales* of the broad and flat involucre imbricated, with scarious margins. *Receptacle* flattish, naked. *Achenia* of the disk and ray similar, striate, destitute of pappus.—Perennial herbs, with alternate, toothed or pinnatifid leaves, and large, terminal single heads; rays white, disk yellow.

21. *CHRYSANTHEMUM*. *Involucre* hemispherical, imbricate; the *scales* with membranous margins. *Receptacle* naked; *pappus* none.—Chinese ornamental plants, with alternate, lobed leaves.

22. *PYRETHRUM*. *Involucre* hemispherical, imbricate; *scales* with membranous margins. *Receptacle* naked. *Pappus* a membranous margin crowning the achenia.—Chiefly perennial herbs with alternate leaves.

23. *BIDENS*. *Heads* many-flowered; either homogamous and discoidal, or more frequently both the one and the other in the same species. *Ray-florets*, few or none, pistillate, ligulate, neuter; *disk-florets* perfect. *Involucral scales* in two rows, the outer commonly large and foliaceous. *Receptacle* flattish; the concave chaff deciduous with the fruit. *Branches of the style* terminated by a short cone. *Achenia* flattened parallel with the scales of the involucre; or slender and four-sided, crowned with two or more rigid and persistent awns which are barbed downwardly.—Annuals or perennials with opposite various leaves, and mostly yellow flowers.

24. *SENECIO*. *Heads* many-flowered, discoid, with the flowers all perfect and tubular, or mostly radiate, the rays pistillate. *Scales of the involucre* in a single row, withered at the points, or with a few bractlets at the base. *Receptacle* flat, not chaffy. *Pappus* of numerous very soft and slender capillary bristles.—A vast genus, embracing 600 species of herbs and shrubs, with alternate leaves, and solitary or corymbed heads. Flowers chiefly yellow.

SUB-TRIBE II. GNAPHALINEÆ.

Heads all discoid.

25. *ARTEMISIA*. *Heads* discoid, few or many-flowered, heterogamous, with the central flowers perfect and five-toothed; and the marginal pistillate in a single series with a tubular, three-toothed corolla; or

sometimes homogamous, with the flowers all perfect. *Involucral scales* imbricated, mostly dry, with scarious margins. *Receptacle* small, without paleæ, flattish or convex, naked or fringed with hairs. *Achenia* obovoid, bald, with a minute epigynous disk, and destitute of pappus.—Herbs or shrubby plants, bitter and aromatic, with alternate leaves, and yellowish or purplish flowers in small spicate or racemosed heads.

26. TANACETUM. *Heads* discoid, homogamous, with the flowers all tubular and perfect, or heterogamous; the marginal flowers chiefly pistillate, in a single series, usually three or four-toothed, forming a kind of ray. *Involucral scales* minute, dry, imbricated; *involucre* hemispherical. *Corollas* of the disk four to five-toothed. *Receptacle* naked, convex. *Achenia* sessile, angular or ribbed, smooth, with a large epigynous disk. *Pappus* either wanting, or minute, membranous, entire or toothed, often unequal; coronet-shaped.—Bitter and acrid strong-scented plants, with alternate and much divided leaves, and solitary or corymbosed heads of yellow flowers.

27. GNAPHALIUM. *Heads* discoid, heterogamous; the flowers all tubular; the outer pistillate and very slender, the central perfect. *Involucral scales* dry and scarious, white or colored, imbricated in several rows. *Receptacle* flat, naked. *Pappus* a single row of rough, capillary bristles.—Woolly herbs, with sessile or decurrent leaves, alternate, entire, and clustered or corymbed heads.

28. ANTENNARIA. *Heads* many-flowered, dioecious or nearly so; the flowers all tubular; pistillate corollas filiform. *Involucral scales* imbricated, appressed, scarious and dry, white or colored. *Receptacle* sub-convex or nearly flat, not chaffy, alveolate. *Achenia* somewhat terete. *Pappus* a single row of bristles, which in the fertile flowers are capillary, and in the sterile thickened and club-shaped or barbellate at the summit.—Perennial tomentose herbs, with alternate, entire leaves, and corymbose heads; corolla yellowish.

29. ERECHTHITES. *Heads* many-flowered, discoid, the flowers all tubular and fertile; the marginal pistillate with a slender corolla. *Involucre* cylindrical, simple, slightly calyculate; *scales* in a single row, linear, acute, with a few small bractlets at the base. *Receptacle* naked. *Achenia* oblong, tapering at the end. *Pappus* copious, of very fine and white soft hairs.—Erect and coarse annuals, with simple, alternate leaves, and whitish flowers in paniculate-corymbed heads.

30. AMBROSIA. *Heads* heterocephalous; sterile and fertile flowers occupying different heads on the same plant; the *fertile* one to three

together, and sessile in the axil of the leaves or bracts at the base of the racemes, or spikes of sterile heads. *Sterile involucre* flattish or top-shaped, composed of seven to twelve scales united into a cup, containing five to twenty funnel-form staminate flowers; *anthers* approximate, but distinct; *receptacle* naked. *Fertile involucre* oblong or top-shaped, closed, pointed, and usually with four to eight tubercles or horns near the top in one row, inclosing a single flower which is composed of a pistil only and no corolla; *styles* two; *branches* of the style elongated. *Achenia* ovoid; *pappus* none.—Coarse annual weeds, with mostly opposite leaves, or alternate and lobed, and inconspicuous greenish or whitish flowers.

TRIBE V. CYNARÆÆ.

Heads ovoid, discoid, rarely radiate, homogamous, rarely dioecious, or heterogamous, with the marginal flowers in a single series. Style in the perfect flowers often tumid near the summit; the branches distinct or concreted, minutely pubescent externally; the stigmatic lines reaching their apex and there confluent.

31. CENTAUREA. *Heads* many-flowered, discoid; the flowers all tubular, the marginal mostly falsely radiate and larger, sterile. *Receptacle* bristly. *Involucre* imbricated, the scales margined or appendaged. *Achenia* compressed, with a lateral hilum in front. *Pappus* wanting, or composed of filiform scabrous bristles in several rows, the inner row being smaller and converging.—Herbs with alternate leaves and single heads.

32. CALENDULA. *Heads* many-flowered, radiate; *florets of the ray* ligulate, pistillate; *disk-florets* tubular and sterile; the corolla of all hispid at the base. *Involucre* of many equal leaves, in few rows, with distinct scales. *Receptacle* naked, flat. *Anthers* caudate, subulate, short. *Style* ending in a knotty hispid cone, bifid at the point; that of the ray short, with two long, slender stigmas, smooth below, glandular above. *Ovary* arcuate, fertile. *Achenia* produced by the ligulate florets, all without pappus, usually arranged in two or three rows; the outer more or less rostrate; the intermediate truncate at the apex, prickly at the back, more or less curved, with their sides extended into an entire concave or flat incised membrane; the innermost annular or incurved, muricated at the back, all fertile, especially the innermost. *Achenia* of the disk membranous.—Annual herbs with alternate leaves.

33. CARTHAMUS. *Heads* discoid. *Involucre* dilated at base; *scales* imbricated, closely applied to each other below, but separated and foliaceous above. *Flowers* all tubular and perfect. *Filaments* smooth.

Receptacle silky; *achenia* four-angled, destitute of a pappus.—Herbs with alternate leaves and yellow flowers.

34. *CNICUS*. *Heads* many-flowered; the *ray-flowers* sterile, slender, nearly equal to the disk. *Involucre* ovoid, ventricose; *scales* coriaceous, appressed, produced into a long and rigid pinnated spinose appendage. *Receptacle* densely clothed with capillary bristles. *Achenia* terete, smooth, strongly striate, with a large, lateral basilar areola. *Pappus* triple, the outer being the horny crenated margin of the fruit; the middle one of ten long stiff hairs; the inner of the same number of short bristles.—An annual, somewhat woolly herb, with clasping leaves, and yellow flowers in bracteate heads.

35. *CYNARA*. *Heads* discoid, homogamous. *Involucre* dilated, imbricate; *scales* fleshy, emarginate, pointed. *Receptacle* setaceous. *Pappus* plumose; *achenia* not beaked.—Exotics.

36. *CIRSIUM*. *Heads* many-flowered; the flowers all tubular, perfect and similar, or rarely imperfectly diœcious. *Involucre* subglobose, of many rows of spinose-pointed, imbricated scales. *Receptacle* clothed with soft bristles or hairs; *style* scarcely divided. *Achenia* oblong, smooth, flattish, not ribbed. *Pappus* of numerous bristles united into a ring at the base, plumose to the middle.—Herbs with sessile, alternate leaves, the margins and teeth prickly, and cyanic flowers in large terminal heads.

37. *LAPPA*. *Heads* many-flowered; flowers all perfect and similar. *Involucre* globose; *scales* imbricated, coriaceous, appressed at the base, then subulate, with a horny, hooked, inflexed point. *Receptacle* rather fleshy, flat, with stiff, subulate fringes. *Corollas* five-cleft, regular, with a ten-nerved tube. *Stamens* with papillose filaments; the *anthers* terminated by filiform appendages, and with subulate tails at the base. *Stigmas* few at the apex, diverging, curved outward. *Fruit* or *achenia* oblong, laterally compressed, smooth, transversely wrinkled; the areola at their base hardly oblique. *Pappus* short, in many rows; the hairs deciduous, filiform, rough, not collected into a ring.—Coarse biennials, with large cordate, petiolate and alternate leaves, and purple flowers, varying to white, in small, solitary, or somewhat corymbosed heads.

SUB-ORDER II. LIGULIFLOREÆ. SUCCORY.

Flowers all perfect, ligulate, in a radiatiform or radiant head. Pollen scabrous and many-sided, usually dodecahedral.

TRIBE VI. CICHORACEÆ.

Style cylindraceous above; the branches uniformly pubescent; stigmatic lines terminating below or near the middle of the branches. Plants with a milky juice. Leaves alternate.

38. CICHORIUM. *Heads* many-flowered. *Involucral scales* in two rows, the outer of five short, leafy, spreading scales, the inner of about eight or more, linear, equal, converging scales. *Receptacle* naked. *Achenia* beakless, obscurely five-sided, turbinate, striate. *Pappus* equal, composed of numerous very small chaffy scales, forming a short crown.—Branching perennials, with the root-leaves toothed or pinnatifid; flowers showy, bright blue in sessile axillary and terminal heads.

39. LACTUCA. *Heads* few to several flowered. *Involucre* cylindrical, calyculate-imbricated with two or more series of scales of unequal lengths, membranous at the margin. *Receptacle* naked. *Achenia* ob-compressed, parallel to the scales of the involucre, wingless, abruptly contracted into a long thread-form beak, bearing a copious and fugacious *pappus* of very soft and white capillary bristles.—Caulescent herbs, with entire or pinnatifid leaves, and variable-colored flowers in panicled heads.

40. HIERACIUM. *Heads* many-flowered. *Scales of involucre* imbricated, or only in two series; the outer short and somewhat calyculate. *Receptacle* scrobiculate or somewhat areolar, fimbriate. *Achenia* oblong or columnar, often subclavate, rarely fusiform, striate or ribbed, not rostrate. *Pappus* a single row of persistent, tawny, fragile, capillary bristles.—Perennial herbs, with alternate, entire or toothed leaves, and mostly yellow flowers, single or in panicled heads.

41. NABALUS. *Heads* few or many-flowered. *Involucre* cylindrical, of five to fourteen linear scales in a single row, calyculate, with a few short, appressed bractlets at base. *Receptacle* naked. *Achenia* linear-oblong, striate, or grooved, smooth, not beaked. *Pappus* of copious straw-color or brownish, persistent, capillary, roughish bristles in two rows.—Perennial herbs with thick, tuberous, bitter roots, very variable leaves, and greenish-white or cream-colored flowers, often tinged with purple, in racemose-panicled mostly nodding heads.

42. TARAXACUM. *Heads* many-flowered. *Involucre* double, the outer of short scales, appressed, the upper of long linear scales, erect in a single row. *Receptacle* naked. *Achenia* oblong, ribbed or angled, roughened on the ribs, the apex prolonged into a very slender thread-like beak, bearing the *pappus* of copious soft and white capillary

bristles.—Perennial acaulescent plants, with pinnatifid or runcinate leaves, and yellow flowers.

ORDER LVII. LOBELIACEÆ. LOBELIA.

Herbs or shrubs often with milky juice. *Leaves* alternate, without stipules. *Flowers* axillary and terminal. *Calyx* more or less adherent to the ovary; *limb* five-lobed or entire. *Corolla* persistent, irregularly five-cleft, usually appearing bilabiate, cleft on one side nearly or quite to the base, the tube inserted into the calyx. *Stamens* five, alternate with the corolla lobes; the upper part of the *filaments*, and the *anthers* coherent into a tube; *pollen* ovoid. *Ovary* inferior or semi-superior, supporting a single *style* with a fringed *stigma*. *Fruit* capsular, two or three, rarely one-celled, usually dehiscing at the apex. *Seeds* numerous, anatropous, with a fleshy albumen and straight embryo.

1. LOBELIA. *Calyx* five-lobed, with a short ovoid or hemispherical tube. *Corolla* with a straight tube, split down on the upper side; the *limb* somewhat bilabiate; the *upper lip* of two rather erect lobes, the lower spreading and three-cleft. *Anthers* united, all bearded, or the two lower only; *stigma* two-lobed. *Pod* capsular, two-celled, many-seeded, opening at the top; *seeds* minute.—Herbaceous plants, possessing acrid, emetic and relaxant properties; not poisonous, nor properly narcotic. The flowers are axillary and solitary, or in terminal, bracted racemes.

ORDER LVIII. ERICACEÆ. HEATH.

Herbs or shrubs with simple, alternate or opposite, entire or toothed, mostly evergreen *leaves*, without stipules. *Inflorescence* various. *Calyx* inferior or superior, five-cleft, seldom four or six, rarely entire, persistent. *Corolla* monopetalous, lobed like the calyx, with an imbricated æstivation. *Stamens* generally distinct, equal in number to the lobes of the corolla, or twice as many. *Anthers* two-celled, generally opening by pores, often appendaged. *Ovary* superior or inferior, many-celled. *Style* solitary, simple; *stigma* simple, toothed, or three-cleft. *Fruit* capsular or baccate, four to many-celled. *Seeds* numerous, small, anatropous. *Embryo* straight in the axis of a fleshy albumen.

SUB-ORDER I. VACCINEÆ.

Calyx-tube adherent to the ovary, becoming a berry or berry-like fruit, crowned with the calyx-teeth. Shrubs with scattered leaves.

1. VACCINIUM. *Limb of calyx* four or five-toothed. *Corolla* urceolate, campanulate, or cylindric; *limb* four or five-cleft, reflexed. *Stamens* eight or ten, generally included; *anthers* sometimes two-awned on the back; the cells separate and prolonged into a tube above, opening

by a hole at the apex. *Berry* four or five-celled, globose, many-seeded, surmounted by the remains of the calyx.—Shrubs or undershrubs with white or reddish, solitary or racemose flowers; fruit edible.

2. OXYCOCCUS. *Calyx* superior, four-cleft. *Corolla* four-parted, with sublinear, revolute segments. *Stamens* eight, convergent; *anthers* tubular, two-parted, opening by oblique pores. *Berry* globose, many-seeded.—Slender, prostrate shrubs, with alternate, coriaceous leaves, and edible fruit.

SUB-ORDER II. ERICINÆ.

Ovary free from the calyx. Testa conformed to the nucleus of the seed. Fruit capsular or baccate. Leaves often evergreen. Mostly shrubs.

3. ARCTOSTAPHYLOS. *Calyx* five-parted, persistent. *Corolla* ovate and urn-shaped, with a short, revolute, five-toothed limb. *Stamens* ten, included; *anthers* with two reflexed awns on the back near the apex, opening by terminal pores. *Ovary* globose, depressed, surrounded by three scales; *style* short; *stigma* obtuse. *Fruit* globose, drupaceous, five to ten-celled, cells one-seeded.—Trailing shrubs with alternate leaves, and scaly-bracted nearly white flowers in terminal racemes or clusters.

4. ANDROMEDA. *Calyx* minute, five-parted, persistent. *Corolla* ovoid-cylindric, the limb five, rarely four-cleft, reflexed. *Stamens* ten, rarely eight; *anthers* awned or awnless, short, opening by terminal pores or slits. *Capsule* five-celled, five-valved, the dissepiments produced from the middle of the valves, many-seeded.—Erect or prostrate shrubs, with evergreen or deciduous alternate leaves, and mostly racemed or clustered flowers.

5. GAULTHERIA. *Calyx* campanulate, five-cleft, with two bracts at the base. *Corolla* ovoid-tubular; limb with five, small, revolute lobes. *Stamens* ten, included; *filaments* hairy; *anther-cells* each two-awned at the summit, opening by a terminal pore. *Capsule* depressed, five-lobed, five-celled, five-valved, many-seeded, inclosed when ripe by the calyx which thickens and becomes a globular, fleshy red berry.—Scarcely shrubby plants, with alternate, evergreen leaves, and axillary, nearly white flowers; pedicels bibracteolate.

6. EPIGÆA. *Calyx* large, five parted, with three bracts at base. *Corolla* hypocrateriform; tube villous within, as long as the ovate-lanceolate, pointed, and scale-like nearly distinct sepals; limb five-parted, spreading. *Stamens* ten; *filaments* filiform; *anthers* oblong, awnless,

opening lengthwise. *Capsule* depressed-globular, five-lobed, five-celled, many-seeded.—Prostrate or trailing scarcely shrubby plants, bristly with rusty hairs, with evergreen and reticulated rounded alternate leaves, and rose-colored flowers in small axillary clusters, subtended by scaly bracts.

7. KALMIA. *Calyx* minute, five-parted, small, equal, herbaceous. *Corolla* between rotate and campanulate, five-lobed, furnished on the underside with ten cornute prominences and as many cavities, in which the *anthers* are concealed until they begin to shed their pollen; *filaments* filiform, elastic. *Capsule* globose, five-celled, many-seeded, with a septical dehiscence.—Mostly smooth evergreen shrubs, with alternate or opposite entire coriaceous leaves, and white or red flowers in umbel-like corymbs; pedicels bracted; flowers naked. Poisonous to some animals.

8. RHODODENDRON. *Calyx* deeply five-parted, persistent, small, equal, herbaceous. *Corolla* campanulate, or sub-infundibuliform, rather unequal, five-cleft. *Stamens* ten, rarely fewer, commonly declinate and exserted; *anthers* without appendages, opening by two terminal pores. *Capsule* five-celled, five-valved, opening at the summit; dissepiments introflexed from the margin of the valves.—Shrubs with evergreen or deciduous, entire, alternate leaves; flowers variously shaded from blue through purple to white, and mostly in terminal corymbose clusters.

9. LEDUM. *Calyx* minute, five-toothed. *Corolla* of five obovate and spreading distinct petals. *Stamens* five to ten, exserted; *anthers* opening by two terminal pores. *Capsule* five-celled, five-valved, splitting from the base upward, many-seeded.—Low evergreen shrubs with alternate, evergreen, entire, ferruginous-tomentose beneath, and coriaceous leaves, the margins revolute, and slightly fragrant when bruised. Flowers white, in terminal corymbs.

SUB-ORDER III. PYROLEÆ.

Ovary free from the calyx. Petals nearly distinct. Fruit a capsule. Mostly herbaceous. (*Pyrolaceæ* of Lindley.)

10. PYROLA. *Calyx* five-parted, persistent. *Petals* five, concave and more or less converging, deciduous. *Stamens* ten; *filaments* awl-shaped, naked; *anthers* large, turned outward and inverted in the bud, soon erect, opening by two pores at the scarcely, if at all two-horned apex, more or less four-celled. *Style* long, thick, and generally turned to one side; *stigmas* five, either projecting or confluent with the ring which surrounds them. *Capsule* five-celled, five-valved, from the base upward, opening at the angles, many-seeded; the valves woolly on the edges.—Low and smooth perennial herbs, with running subterranean

shoots, bearing rounded and petioled evergreen root-leaves, and a simple raceme of nodding flowers, on an upright scaly-bracted scape.

11. CHIMAPHILA. *Calyx* five-parted. *Petals* five, spreading. *Stamens* ten; *filaments* dilated and hairy in the middle; *anthers* as in *Pyrola*. *Style* short, inversely conical, immersed in the depressed summit of the globular ovary; *stigma* broad and orbicular, the border obtusely five-toothed. *Capsule* five-celled, opening from the apex downward; *valves* bearing the dissepiments in the middle, not united by a connecting web, and not woolly on the edges.—Low, nearly herbaceous plants, with running underground shoots, and cauline, serrate, evergreen, opposite or irregularly-whorled leaves, and white or purplish, fragrant flowers, terminal.

SUB-ORDER IV. MONOTROPEÆ.

Ovary free from the calyx. Leafless herbs, destitute of verdure.

12. MONOTROPA. *Calyx* represented by one to four scale-like deciduous bracts, the lowest rather distant from the corolla. *Corolla* of five distinct, erect, fleshy petals, which are narrowed below and have a small nectariferous pit at the base. *Stamens* ten; *filaments* persistent, alternating with ten reflexed appendages of the torus; *anthers* short on the thickened apex of the hairy filament, two-celled, opening by transverse chinks. *Stigma* orbicular, five-crenate, beardless. *Capsule* five-celled, and *seeds* as in *Pyrola*.—A singular fleshy and scentless herb, white throughout, the low stems rising in a cluster from a matted mass of fibrous roots, with scales like the petals in place of leaves, bearing a solitary terminal flower, which is at first nodding, but becomes upright in fruit.

13. PTEROSPORA. *Calyx* five-parted. *Corolla* ovate, urn-shaped, five-toothed, reflexed, and persistent. *Stamens* ten; *anthers* peltate, two-celled, two-awned on the back, opening lengthwise. *Style* short; *stigma* five-lobed. *Capsule* globose, depressed, five-lobed, five-celled, loculicidal. *Seeds* very numerous, ovoid, minute, tapering to each end, the apex expanded into a broad reticulated wing, many times larger than the nucleus.—A stout and simple purplish-brown clammy-pubescent, perennial herb; leafless, the wand-like stem furnished toward the base with scattered lanceolate scales in place of leaves, bearing above many nodding white flowers, like those of *Andromeda*, in a long bracted raceme.

ORDER LIX. AQUIFOLIACEÆ. HOLLY.

Shrubs or trees with evergreen, alternate or opposite, simple, coriaceous, exstipulate leaves. *Flowers* small, white or greenish, axillary, soli-

tary or clustered, sometimes diœcious. *Sepals* four to six, imbricate in æstivation. *Corolla* regular, four to six-parted, hypogynous, imbricate in æstivation. *Stamens* inserted into the tube of the corolla, and alternate with its segments; *filaments* erect; *anthers* adnate, two-celled, with a longitudinal dehiscence. *Disk* none. *Ovary* fleshy, superior, a little truncated, with two to six or more cells; *ovules* solitary, pendulous, often from a cup-shaped funiculus; *stigma* subsessile, lobed. *Fruit* drupaceous, fleshy, indehiscent, with from two to six or more stony seeds. *Seeds* suspended and solitary in each cell, nearly sessile, anatropous, with a minute embryo in a large fleshy albumen.

1. ILEX. *Calyx* small, four or five-toothed, persistent. *Corolla* larger than the calyx, sub-rotate, four or five-parted; *petals* oval, or obovate, obtuse. *Stamens* four or five, alternate with the petals; *filaments* awl-shaped, shorter than the corolla; *anthers* small, two-lobed. *Ovary* roundish, four-celled, each with one ovule; *style* none; *stigmas* four, sessile, obtuse, permanent. *Fruit* a berry, globular, four-celled; *seeds* solitary in each cell, oblong, pointed, angular at the inside, rounded externally.—Shrubs and trees with alternate and spinose-dentate leaves; flowers often diœcious by abortion.

2. PRINOS. Flowers often diœcious or polygamous. *Calyx* mostly six-cleft, small, persistent. *Corolla* deeply six-cleft, rotate. *Stamens* six; *filaments* subulate, erect, shorter than the corolla; *anthers* oblong, obtuse. *Ovary* superior, ovate, bearing a single *style* with an obtuse *stigma*. *Fruit* a berry, with six stones or bony seeds, which are convex on one side, and angular at the other.—Shrubs with alternate leaves, and axillary or terminal flowers.

ORDER LX. EBENACEÆ. EBONY.

Trees or shrubs without a milky juice, and with a heavy wood. *Leaves* alternate, exstipulate, coriaceous, entire. *Inflorescence* axillary. *Flowers* by abortion diœcious, seldom perfect. *Calyx* free, monopetalous, three to seven-lobed, persistent. *Corolla* regular, monopetalous, three to seven-lobed, deciduous, sericeous, imbricate in æstivation. *Stamens* twice to four times as many as the lobes of the corolla, unequal; *filaments* short; *anthers* free, introrse, two-celled, dehiscing longitudinally. *Ovary* free, three to twelve-celled, usually hispid. *Styles* usually with as many divisions as cells in ovary. *Stigmas* small, terminating the styles or the divisions of the style. *Fruit* a fleshy, oval, or globose berry, three to many-celled and seeded; or, by abortion, one-celled and seeded. *Seeds* usually compressed laterally, with a smooth coriaceous testa, anatropous; the embryo shorter than the hard albumen.

1. DIOSPYROS. *Flowers* diœcious. *Calyx* four to six-cleft. *Corolla* tubular or campanulate, four to six-cleft, convolute in æstivation. Males;

ing that
his side—Love.

A Valuable Find.

The family name of the Marquis of Normandy is Phipps. The founder of the great house of Phipps was William Phips, one of the twenty-six children of a working gunsmith at Bristol.

William Phips was born in 1651, in New England, to which country his father had emigrated, and when he grew up was apprenticed to a ships' carpenter. He was an astonishing youngster, extraordinarily strong and robust, healthy, and remarkably good-looking. Of his adventures as a youth there is here no space to speak. Once he barely escaped alive from Indians, and another time was brought near ruin by the loss of his ship. Then he heard of a mighty Spanish wreck-treasure in the Bahamas, and at once he made for England, where by sheer pluck and importunity he got his venture financed by the Duke of Albemarle and others. In 1683 he was back at the Bahamas in the "Alger Rose," a frigate of eighteen guns.

For weeks he sought the treasure in vain. The men mutinied. Phips rushed among them with his bare fists and quelled them. A second time they banded against him. Only the carpenter remained faithful. He told Phips, and the two trained the guns on the mutineers. The men fell on their knees and swore they would be faithful. He took them to Jamaica, turned them off, and secured a fresh crew; and then at last, on the reef called the Boilers, happened on the wreck, and, without the loss of a man, recovered thirty-two tons of silver and other treasure, worth in all £320,000.

Phips' share was £16,000, the position of High Sheriff of New England, and a knighthood from King James. He adopted a nephew as heir; and it is from this man, Constantine Phips, that the present noble House of Normandy is derived.

A Poem of Peace.

Stillness reigns
O'er the warm, wide field,
Where naught remains
Of the season's yield;
Loosed is the yoke,
And hush'd the din
Of harvest folk—
The crop is in.
The round dim sun
On his saffron bed,
Sinks as upon
Fields harvested,
And never a breath
From edge or trees,
Murmureth
In a world at peace.
Would in my breast
The peace profound
Of doves that nest
Might hence abound—
Might—thence unthrust,
Nor taking wing,
Fill me with trust
And thanksgiving!

—Lucie Allan, Stockton.

...recommen-
...uses, being very hea-
stock.—Mr. Barker, 129, Queen's Parade, Scarbor-

HOME-MADE DISTEMPER.

Get a 2d packet of whitening and three or four "Dolly" dyes, whatever colour required. Mix whitening to a smooth paste, then add sufficient water to do the four walls. In a 2lb jar scald your dyes, then add to whitening sufficient to make colour required (if a cupful of flour starch is added it will not rub off). This is entirely my own idea. I have done my sitting-room cream. The wallpaper had a cream ground with pale flower pattern, and it is quite a success. I had previously failed entirely with a large packet of distemper.—E. Warrior, 1 Holly-street, Middlesbrough.

WHITE MARKS ON POLISHED OAK TABLE.

The only cure is to scrape the table top with a cabinet-maker's scraper, then rub with fine sandpaper and repolish. Any other way would only be patchy.—Mrs. Harrison, 7, Middleton-street, Stockton.

Damp a piece of flannel with methylated spirit, rub the marked place well. Then with another piece rub in linseed oil till it polishes.—Mrs. Hodgson, 23, Queen-street East, Thornaby.

First wash the table with a washleather with warm water, to which a little vinegar has been added. Apply salad oil to the marks, rubbing them thoroughly with it, and allow it to soak in. Then rub them with spirits of wine, and the marks will disappear. Apply beeswax mixed with turpentine to the whole surface, and finish with a soft cloth.—Miss E. Thompson, Sion Hill, Thirsk.

TO CLEAN A BEDSTEAD.

To renovate a bedstead.—The best way to clean black and gilt bedsteads is the following:—Take a small quantity of strong liquid ammonia, and mix it to a thin paste with fine chalk or whitening. See that the paste is smooth and free from lumps. Rub this mixture on all parts where the gilt is tarnished. It must be rubbed vigorously, and the tarnish will soon be removed. For the ironwork of the bedstead, thoroughly sandpaper it all over and apply two coats of black Japan, and get two bottles of black enamel from any ironmongers and brush it well. It will then look like new. For a rusty spring mattress.—Get 1lb. of aluminium paint from any ironmongers, brush mattress with stiff brush, and give it a coat. It will never rust again. I have done this myself to very rusty bedsteads, and I have found that it makes them quite new again.—Mrs. James Wilson, 36, Tees-street, North Ormesby.

TO REMOVE TEA STAINS FROM CARPET.

Put a tablespoonful of ammonia into a pint of hot water, and scrub the stains with a clean brush. Rub dry with a clean cloth, then make a paste with Fuller's earth and cold water, lay over the stains and leave until dry; then brush off. Have never known the above to fail for carpets, rugs, and table-covers.—Miss P. Clements, 9, Auckland-street, Guisborough.

Ink stains or any stain on carpets which are not of long standing can be removed by applying a thick paste made of starch and cold water and leaving it for 24 hours. If any starch powder remains brush it off. A second application may be necessary. Also fresh ink stains on woollen goods usually yield to this treatment.—"Regular Reader."

If the stain is not large, pure benzine will be found very effective. Rub it well in with a clean linen rag, and repeat till the stain is removed. Benzine will not in the least injure the colour of the carpet. It is, however, dangerously inflammable and must not be used at night nor in a room where there is a fire.—Miss L. Tulip, Front-street Annfield Plain.

next day, and—
her husband, "take this poem
begin all over again."—M. Watson

**HOW LIGHTNING
STRIKES.**

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As a rule, during a thunderstorm, one is safer in a forest than in open country, because in the latter a person is a raised object attracting the lightning, while in the woods the bolts select the highest trees. Investigation in many forests showed that lightning had its distinct preferences. For instance, oak trees are struck 48 times oftener than beech trees. Some trees like the beech, walnut, etc., contain much fatty matter, while others—the oak, poplar, willow, and ash—are rich in starch. Lightning rather avoids the former, preferring the latter, isolated willows and poplars being particularly liable to visits from lightning. Do not seek protection under a tree near the edge of a forest. Do not stand under a tree having dead limbs—dead wood attracts lightning; and do not seek shelter under a giant tree—there is far greater safety under a small one. Don't forget this when caught in a thunderstorm.—Robert McCulloch, Glasgow.

**BY HOOK OR
BY CROOK.**

"By Hook or by Crook" is a saying we hear,

THE
SUB
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them. No. 426 writes that
and getting stronger, but had an
in her bath-chair, which upset her
424 has suffered a sad loss through
the death of her youngest child, 10 months old.
She thanks her Club friends for birthday cards,
and is always glad to have their letters. No. 306
has not yet got her son home from military service,
although he is badly needed. We hope she will
resume taking the "Northern Weekly Gazette"
now that it has increased in size. No. 353's brother
was interned in Germany four years and two
months, and came back in perfect health. If all
returned civilians could say the same there would
be fewer sad hearts to-day! Many thanks to Nos.
636 and 701 for p.c.'s, also to No. 707 for her "Open
Letter," which will appear next week.

★ OUR OPEN LETTER.

Dear Lady Editor and Fellow Members.—What a
body of members we are now, are we not? Once
more I am writing to you all, but under what
different circumstances. The noise of war is silent,
men have returned to their homes and civil life,
and peace terms will, I hope, soon be signed. What
thankful hearts we shall all have then. I have
heard of several members complaining because
other members have not written (as they think). I
know of one instance where two or three members
have written to one member and had no reply, yet
this very member complains of not hearing from
other members. Surely the fault must be with the
post. I forwarded a letter, which was sent to my
home for someone else, yet it never reached its
destination. We must, therefore, be dis-
satisfied but write again.—Yours

Jan 161

is for condensed with
other other salts

Hydro Chloric = Hydrogen
& Chlorine

Sulphate of Iron = Salt of
Sulphuric acid

Chloride of Potassa, Chlorine & Potash

Acetate of Ammonia Salt of acetic acid

~~Acetic~~ Acid of Nitric acid
= Nitrogen & Oxygen

Magnesia Oxide of Magnesia

Cresote

72 out of every 100 are soluble.

$\frac{3}{4}$ lb.

$\frac{6}{8}$ (50)

$\frac{48}{100}$



stamens eight to many, mostly sixteen, inserted into the base of the corolla; *filaments* shorter than the anthers, sometimes every other one bearing two anthers; *anthers* subulate, fixed by the base. *Ovary* abortive; *style* none. Females; *stamens* mostly eight, without anthers. *Style* two to four-parted; *stigmas* four or five. *Fruit* an ovoid or globose berry, succulent, four to twelve, mostly eight-celled; *cells* one-seeded; *seeds* compressed.—Fertile flowers axillary and solitary; the sterile smaller and often clustered.

ORDER LXI. STYRACACEÆ. STYRAX.

Trees or shrubs with alternate, simple, exstipulate leaves, becoming yellow on drying. *Flowers* or *racemes* solitary, axillary, bracteate. *Calyx* inferior or superior, five-parted, persistent. *Corolla* monopetalous, often differing in the number of its divisions from those of the calyx; imbricated in æstivation. *Stamens* unequal, more or less coherent; *anthers* innate, two-celled. *Ovary* superior, or adhering to the calyx, two to five-celled, the partitions sometimes hardly reaching the center; *style* simple; *stigma* somewhat capitate. *Fruit* drupaceous, surmounted by or inclosed in the calyx, with one to five cells, and seeds.

1. STYRAX. *Calyx* sub-campanulate, nearly entire or five-toothed. *Corolla* campanulate at the base, deeply three to seven-cleft. *Stamens* six to sixteen, exserted; *filaments* united to the tube of the corolla, sometimes adhering at the base into a ring; *anthers* linear, two-celled, opening by internal longitudinal slits. *Style* simple, with an obtuse, somewhat lobed *stigma*. *Fruit* a dry drupe, splitting imperfectly into two or three valves, with one to three stones. *Seeds* solitary, erect, with a large, leafy thin embryo lying in the midst of fleshy albumen, with an inferior radicle.—Abounding in a fragrant juice.

ORDER LXII. SAPOTACEÆ. GUTTA-PERCHA.

Trees or shrubs often abounding in a milky juice, and having alternate, or sometimes almost verticillate leaves, entire, coriaceous, and exstipulate. *Calyx* regular, persistent, five or four to eight-lobed, valvate or imbricate in æstivation. *Corolla* monopetalous, hypogynous, regular, deciduous; *segments* usually equal in number to those of the calyx, sometimes twice or thrice as many; imbricate in æstivation. *Stamens* arising from the corolla, definite, distinct; *fertile* ones equal in number to segments of calyx; *anthers* usually extrorse; *sterile* stamens as numerous as, and alternate with, the fertile. *Ovary* superior, many-celled, each containing a single ascending or pendulous ovule; *style* one; *stigma* undivided, or sometimes lobed. *Fruit* fleshy, with several one-seeded cells, or by abortion with one cell only. *Seeds* nut-like; with a bony

shining testa, *having a large hilum*; *embryo* erect, large, in a fleshy albumen. (ISONANDRA GUTTA.)

ORDER LXIII. PRIMULACEÆ. PRIMROSE.

Herbaceous, sometimes suffruticose plants, annual or perennial. *Leaves* usually radical, otherwise mostly opposite, exstipulated. *Flowers* on the scapes and in umbels or variously arranged in the axils of the leaves. *Calyx* free from the ovary, or partly coherent, five, rarely four-cleft, regular, persistent. *Corolla* five, rarely four-cleft, regular. *Stamens* inserted on the tube of the corolla, as many as its lobes, and opposite to them. *Ovary* one-celled, with a free central placenta. *Style* and *stigma* simple. *Fruit* a one-celled, many-seeded capsule, the fleshy placenta attached only to the base of the cell. *Seeds* with a small embryo in fleshy albumen, amphitropous and fixed by the middle, except in *Hottoniæ*.

1. ANAGALLIS. *Calyx* in five, deep, spreading, acute, keeled segments, permanent. *Corolla* rotate, with almost no tube; *limb* nearly flat, in five deep, roundish-ovate segments, contracted at their base. *Stamens* five; *filaments* erect, slender, shorter than the corolla, clothed with prominent glandular hairs, more especially in the middle; *anthers* cordate, introrse. *Style* thread-shaped; *stigma* capitate, or sometimes simple. *Capsule* globose, membranaceous, circumscissile, one-celled, many-seeded. *Seeds* angular, abrupt, covering a large, central, orbicular, pitted, unconnected receptacle.—Small, spreading or procumbent herbs, with square stems, and whorled or mostly opposite leaves; flowers solitary on axillary peduncles.

ORDER LXIV. PLANTAGINACEÆ. PLANTAIN.

Herbaceous, usually acaulescent plants, with mostly rosulate *leaves*, and *flowers* in spikes. *Calyx* four-cleft, persistent. *Corolla* dry, membranaceous, veinless; the *limb* four-parted, persistent. *Stamens* four, inserted into the corolla-tube, alternate with its segments; *anthers* versatile. *Ovary* two-celled, sessile. *Style* single. *Fruit* a pyxis, membranaceous, two-celled; *cells* one to several-seeded.

1. PLANTAGO. *Calyx* of four, rarely three, imbricated, persistent sepals, with dry, membranaceous margins. *Corolla* tubular, marescent, with a four-parted, reflected border. *Stamens* four, generally with long and weak *filaments*, and fugacious *anthers*. *Style* simple; *stigma* unilateral. *Capsule* ovoid, two-celled, circumscissile, few or many-seeded.—Acaulescent herbs, with all radical, ribbed leaves, and small, whitish spicate flowers.

ORDER LXV. PLUMBAGINACEÆ. LEADWORT.

Herbaceous or suffruticose plants, variable in appearance. *Leaves* undivided, alternate, or sometimes all radical, and the flowers on a scape. *Calyx* tubular, five-toothed, plaited, persistent. *Corolla* regular, hypocrateriform, of five petals united at base, sometimes nearly distinct. *Stamens* five, hypogynous, and opposite the petals, or inserted on their claws. *Ovary* superior, one-celled; *ovule* pendulous, attached to the apex of a filiform podosperm which rises from the bottom of the cell. *Styles* five, seldom three or four, partially united or distinct. *Fruit* an utricle, indehiscent, or opening by valves; *seed* inverted; *testa* simple; *embryo* straight; *radicle* superior.

1. STATICE. *Flowers* scattered or loosely spiked on the branches of a compound corymb, one-sided, two or three-bracted. *Calyx* funnel-form, plaited, dry and membranaceous, persistent. *Corolla* of five, nearly or quite distinct petals, with long claws, the five *stamens* attached to their bases. *Styles* five, separate; *ovary* superior. *Fruit* membranous and indehiscent, one-seeded, in the bottom of the calyx. *Embryo* straight in mealy albumen.—Sea-side, or salt-marsh perennials, with thick and stalked leaves, radical or cauline.

ORDER LXVI. OROBANCHACEÆ. BROOM-RAPE.

Herbaceous leafless plants, growing parasitically upon the roots of other plants; the *stems* furnished with scales, and bearing solitary or spicate flowers. *Calyx* four or five-toothed, inferior, persistent. *Corolla* monopetalous, hypogynous, persistent, imbricate in æstivation; more or less bilabiate, the upper lip entire or bilobed, the lower three-lobed. *Stamens* four, didynamous, inserted on the tube of the corolla; *anthers* two-celled, persistent, the cells distinct, parallel, often mucronate or bearded at base. *Ovary* superior, one-celled, seated in a fleshy disk, with two or four parietal polyspermous placentæ; *style* one; *stigma* two-lobed. *Fruit* capsular, inclosed within the withered corolla, one-celled, two-valved, each valve bearing one or two placentæ in the middle. *Seeds* very numerous and minute; *embryo* minute, inverted, at the apex of a fleshy albumen.

1. OROBANCHE, or CONOPHOLIS. *Calyx* two to five-cleft, the segments often unequal. *Corolla* ringent, withering; *limb* four or five-lobed; *upper lip* concave, notched, the lower reflexed in three unequal wavy lobes. *Ovary* seated in a fleshy disk. *Stamens* protruded; *anthers* sagittate, with the lobes pointed at the base; *filaments* almost as long as the tube of the corolla, downy and glandular. *Capsule* ovoid, acute, one-celled, two-valved, many-seeded, with four parietal parallel placentæ.—

Perennials with mostly simple stems ; upper scales forming bracts to the flowers.

2. *EPIPHEGUS*. *Perfect flowers* sterile ; *imperfect* fertile. *Calyx* short, five-toothed. *Perfect corolla* two-lipped ; the upper lip emarginate, the lower three-toothed ; *imperfect corolla* minute, four-toothed, deciduous. *Stamens* as long as the corolla ; *filaments* smooth ; *anthers* two-lobed, acute at the base, valveless, dehiscent in the middle. *Stigma* capitate, somewhat emarginate. *Capsule* gibbous, compressed, half two-valved, with four diverging placentæ.—Perennials, with virgate, simple branches which are floriferous their whole length.

ORDER LXVII. SCROPHULARIACEÆ. FIGWORT.

Herbs undershrubs, or rarely shrubs, scentless or fetid, rarely aromatic, with opposite, verticillate, or alternate *leaves*. *Flowers* axillary or racemose, rarely spiked. *Calyx*, sepals four or five, unequal, more or less united at base, inferior, persistent. *Corolla* bilabiate, personate or otherwise irregular, the lobes imbricate in æstivation. *Stamens* four, didynamous, rarely with the rudiment of the fifth ; sometimes two only, the three others either rudimentary or wholly wanting. *Ovary* free, two-celled. *Style* simple or rarely shortly bifid ; *stigma* generally simple, entire, emarginate, or bifid. *Fruit* capsular, two-celled, two-valved, with central placentæ. *Seeds* indefinite, albuminous ; *embryo* straight.

1. *VERBASCUM*. *Calyx* five-parted. *Corolla* rotate, five-lobed, open or concave ; the *lobes* broad and rounded, a little unequal. *Stamens* five, declinate, all perfect ; all the *filaments*, or the three upper, woolly. *Style* flattened at the apex. *Capsule* ovoid-globose, two-valved, many-seeded.—Tall and usually woolly biennial herbs, with alternate leaves, those of the stem sessile or decurrent ; flowers in terminal racemes, ephemeral.

2. *SCROPHULARIA*. *Calyx* in five acute, nearly equal segments. *Corolla* subglobose, with a short five-lobed limb, the segments of which are rounded, and the uppermost united into an upper lip. *Stamens* didynamous, declinate, with transverse, one-celled anthers ; a fifth rudimentary stamen with a lamelliform anther, often present. *Stigma* emarginate. *Capsule* roundish, often acuminate, with the valves entire or just bifid.—Rank herbs, with mostly opposite leaves, and small greenish-purple or lurid flowers in loose cymes, forming a terminal narrow panicle.

3. *CHELONE*. *Calyx* deeply five-parted, with three bracts at base. *Corolla* inflated-tubular, with the mouth a little open ; the *upper-lip* broad and arched, keeled in the middle, notched at the apex ; the *lower*

woolly-bearded in the throat, three-lobed at the apex, the middle lobe smallest. *Stamens* four, with woolly filaments, and very woolly heart-shaped anthers; and a fifth sterile filament, smooth above, and shorter than the others. *Capsule* two-celled, with entire valves. *Seeds* many, broadly membranaceous, winged. — Smooth perennials, with upright branching stems, opposite serrate leaves, and large white or purple-rose-colored flowers, which are nearly sessile in spikes or clusters, and closely imbricated with round-ovate concave bracts and bractlets.

4. DIGITALIS. *Calyx* five-parted, sepals rounded or acute, permanent, much shorter than the corolla; the uppermost narrowest. *Corolla* campanulate, ventricose, contracted at the base with an oblique limb; upper lip emarginate, lower trifid with the middle lobe the largest. *Stamens* four, didynamous, inserted into the base of the corolla; *anthers* acute, naked. *Stigma* bilamellate. *Capsule* ovate, two-celled, two-valved, with a septicidal dehiscence. — Herbs or shrubs, exotic, with lower leaves crowded, petiolate, upper alternate; flowers in showy racemes.

5. VERONICA. LEPTANDRA. *Calyx* five-parted. *Corolla* sub-rotate, deeply four-cleft, lower segments mostly narrow. *Stamens* two, one each side of the upper lobe of the corolla, exserted; *anther-cells* confluent at the apex. *Style* entire; *stigma* single. *Capsule* compressed, usually obtuse or notched at the apex, two-celled, few to many-seeded. — Chiefly herbs with various foliage; leaves opposite; blue, flesh-color or white flowers in axillary or terminal racemes.

6. GERARDIA. *Calyx* campanulate, five-cleft or toothed. *Corolla* campanulate-tubular, swelling above, with five more or less unequal spreading lobes, the two upper usually rather smaller and more united. *Stamens* four, strongly didynamous, included, hairy; *anthers* approaching by pairs, two-celled; the cells parallel, often pointed at the base. *Style* elongated, mostly enlarged and flattened at the apex. *Capsule* ovate, pointed, many-seeded. — Erect branching herbs, with the stem-leaves opposite, the upper often alternate; the uppermost reduced to bracts and subtending one-flowered peduncles, which often form a raceme or spike; flowers showy, purple or yellow.

7. DASYSTOMA. *Calyx* campanulate, half five-cleft, the lobes often toothed, imbricate in æstivation. *Corolla-tube* elongated, dilated, woolly inside, as well as the anthers and filaments. *Stamens* included, didynamous; *anthers* all equal, awned at the base. *Capsule* ovate, acute, two valves bearing the septum in the middle; *seeds* numerous. — Erect perennial herbs, with large, yellow flowers, and leaves similar to Gerardia, pinnatifid or toothed.

8. EUPHRASIA. *Calyx* tubular or campanulate, four-cleft. *Upper lip* of the *corolla* scarcely arched, two-lobed, the lobes broad and spreading; *lower lip* spreading, three-cleft, the lobes obtuse or notched; *palate* not plaited. *Stamens* four, fertile, under the upper lip; *anther-cells* equal, spurred or pointed at the base. *Capsule* oblong-ovate, compressed, emarginate, with entire valves; *seeds* few or numerous, oblong, grooved lengthwise.—Herbs with branching stems, and opposite toothed or cut leaves; flowers small, in one-sided terminal spikes.

ORDER XLVIII. VERBENACEÆ. VERVAIN.

Trees and shrubs, sometimes herbs, with usually opposite, simple or compound, exstipulate leaves. *Flowers* in axillary corymbs or dense heads, or alternate-spicate. *Calyx* tubular, four or five-toothed, inferior, persistent. *Corolla* tubular, the limb bilabiate or irregularly four or five-cleft, deciduous. *Stamens* four, didynamous, seldom equal, occasionally only two. *Ovary* two or four-celled; *ovules* erect or pendulous, solitary or twin; *style* one; *stigma* bifid or undivided. *Fruit* drupaceous, baccate, or dry, dividing into two or four one-seeded portions. *Seeds* erect or pendulous, exalbuminous, with an erect embryo.

1. VERBENA. *Calyx* five-toothed, with one of the teeth often truncate and shorter than the others. *Corolla* funnel-form, often curved, salver-form, the limb unequally five-cleft. *Stamens* four, included; the upper pair occasionally without anthers. *Style* slender; *stigma* capitate. *Fruit* or *pericarp*, splitting into four seed-like nutlets, thin, evanescent.—Herbs with opposite leaves; flowers mostly alternate-spicate, sessile, bracted.

ORDER LXIX. LABIATÆ OR LAMIACEÆ. MINT.

Herbs or undershrubs with four-cornered stems and opposite branches. *Leaves* opposite, without stipules, replete with receptacles of aromatic oil. *Flowers* in opposite, nearly sessile, axillary verticillasters, sometimes as if in whorls, spikes or heads; *color* almost always of the cyanic series, blue, purple, red, white, etc. *Calyx* tubular, inferior, persistent, the odd tooth being next to the axis; regular five or ten-toothed, or irregular bilabiate, or three to ten-toothed. *Corolla* monopetalous, hypogynous, bilabiate; the upper lip bifid or entire, overlapping the lower which is larger and three-lobed. *Stamens* four, didynamous, inserted on the corolla, alternately with the lobes of the lower lip, the two upper stamens often abortive; *anthers* mostly two-celled. *Ovary* deeply four-lobed, seated in a fleshy hypogynous disk, each lobe with a single erect ovule; *style* one, proceeding from the base of the lobes of the ovary; *stigma* bifid, usually acute. *Fruit* one to four small nuts or

achenia included in the persistent calyx. *Seeds* erect, with little or no albumen; *embryo* erect; *cotyledons* flat; *radicle* at the base of the fruit.

TRIBE I. OCIMOIDEÆ.

Corolla sub-bilabiate, the four upper lobes nearly equal, the lower one declinate, flat or concave, carinate or saccate. Stamens four, declined.

1. *LAVANDULA*. *Calyx* tubular, nearly equal, thirteen or rarely fifteen-ribbed, shortly five-toothed, with the four lower teeth nearly equal, or the two lower narrower; the upper either but little broader than the lateral ones, or expanded into a dilated appendage. *Upper lip* of *corolla* two-lobed, *lower* three-lobed; all the divisions nearly equal; the *throat* somewhat dilated. *Stamens* didynamous, declining; *filaments* smooth, distinct, not toothed; *anthers* reniform, one-celled.—Odoriferous, suffruticose plants, with narrow rigid leaves, and small whitish flowers.

TRIBE II. MENTHOIDEÆ.

Corolla somewhat campanulate or funnel-form; tube scarcely exerted, limb subequally four or five lobed. Stamens four, sometimes two, distant, straight, diverging.

2. *MENTHA*. *Calyx* campanulate or tubular, five-toothed, equal or somewhat two-lipped, with the throat naked inside, or villous. *Corolla* with the tube inclosed, the limb campanulate, nearly equal, four-cleft; the upper segment broader, nearly entire or emarginate. *Stamens* four, equal, erect, distant; *filaments* smooth, naked; *anthers* with two parallel cells. *Style* shortly bifid, with the lobes bearing stigmas at the points. *Fruit* dry, smooth.—Odoriferous herbs, with small whitish or pale-purple flowers in close clusters.

3. *LYCOPUS*. *Calyx* oblong-campanulate, equal, four or five-toothed, with the throat naked inside. *Corolla* campanulate, scarcely longer than the calyx, nearly equal four-lobed; upper segment broadest, emarginate. *Stamens* two, rather projecting, distant; the upper pair either sterile rudiments or wanting; *anthers* two-celled, with nearly parallel distinct cells. *Seeds* four, smooth, retuse.—Perennial low herbs, with sharply-toothed or pinnatifid leaves, and mostly white flowers in dense axillary whorls.

TRIBE III. MONARDEÆ.

Corolla bilabiate; tube exerted. Stamens two, fertile, ascending, the upper pair abortive; anthers linear with the two cells contiguous, or halved with the two cells widely separated on opposite ends of a long, transverse connectile.

8. MONARDA. *Calyx* tubular, elongated, fifteen-nerved, nearly equally five-toothed, usually hairy in the throat. *Corolla* with an elongated tube, a slightly expanded throat, and a strongly two-lipped limb; the lips linear or oblong, subequal; the upper erect, entire or slightly notched; the lower spreading, three-lobed at the apex, the lateral lobes ovate and obtuse, the middle one narrower and slightly notched. *Stamens* two, fertile, elongated, ascending, exerted, inserted in the throat of the corolla; *anthers* linear, the cells divaricate at base, connate at apex. *Style* one, with a lateral *stigma*.—Odoriferous erect perennial herbs, with entire or toothed leaves, and flowers in a few capitate whorls, closely surrounded with bracts.

5. SALVIA. *Calyx* sub-campanulate, striate, bilabiate; the upper lip mostly three-toothed, the lower bifid. *Corolla* scarcely longer than the calyx, deeply two-lipped, ringent; the upper lip straight or scythe-shaped, entire or barely notched; the lower spreading or pendent, three-lobed, the middle lobe larger. *Stamens* two, fertile, on short filaments, jointed with the elongated transverse connective, one end of which ascending under the upper lip, bears a linear, one-celled, (half) *anther*, the other usually descending and bearing an imperfect or deformed, (half) *anther*. *Achenia* four.—The transverse connectile constitutes the essential character of this genus. The flowers are usually large and showy, in spiked, racemed, or panicled whorls.

6. ROSMARINUS. *Calyx* ovate-campanulate, two-lipped; the upper one entire, the lower bifid. *Corolla* with the tube smooth, not ringed in the inside, somewhat inflated in the throat; *limb* bilabiate; *lips* nearly equal, the upper one erect and emarginate, the lower spreading, trifid, with the lateral lobes erect, but somewhat twisted; the middle one large, concave, declining. *Stamens* two, ascending, inferior, exerted; no rudiments of superior stamens; *filaments* toothed at base; *anthers* linear, with two divaricating confluent cells. *Upper lobe of the style* very short; *stigmas* minute, terminal.—Exotic.

TRIBE IV. SATURINEÆ.

Calyx five-toothed and equal, or bilabiate, with the upper lip trifid, and the lower bifid. *Corolla* sub-bilabiate, upper lip erect, flat, entire or bifid; lower spreading, tripid, lobes subequal; tube about as long as the calyx. *Stamens* two or four, distant, straight, diverging.

7. PYCNANTHEMUM. *Calyx* ovate-oblong, or tubular, about thirteen-nerved, equally five-toothed, or the three upper teeth more or less united, naked in the throat. *Corolla* with a short tube, and a somewhat two-lipped, border; the upper lip nearly flat, entire, or slightly notched; the lower three-cleft; middle lobe longest; all the lobes ovate

and obtuse. *Stamens* four, distant, the lower pair rather longer; *anther-cells* parallel.—Perennial upright herbs, with a pungent mint-like flavor, corymbosely branched above; the floral leaves often whitish; corolla whitish or flesh-color, the lower lip mostly dotted with purple; the many-flowered whorls dense, crowded with bracts, and usually forming terminal heads or close cymes.

8. *ORIGANUM*. *Calyx* ovate-tubular, hairy in the throat, ten to thirteen-nerved, nearly equally five-toothed; *throat* villous within. *Corolla-tube* about the length of the calyx, slightly two-lipped; the upper lip rather erect and slightly notched; the lower one of three nearly equal, spreading lobes. *Stamens* four, exserted, didynamous, the lower ones longer. *Style* bifid at the point. *Achenia* dry, somewhat smooth.—Herbs with nearly entire leaves, and purplish flowers crowded in cylindrical or oblong spikes, which are imbricated with colored bracts.

9. *THYMUS*. *Flowers* capitate or verticillate. *Calyx* sub-campanulate, bilabiate, thirteen-nerved, hairy in the throat; the upper lip three-toothed, spreading; the lower two-cleft, with the awl-shaped divisions ciliate. *Corolla* short, slightly bilabiate; the upper lip straight and flattish, notched at the apex; the lower spreading, equally three-cleft, or the middle lobe longest. *Stamens* four, straight and distant, usually exserted.—Low, mostly prostrate and diffuse perennials, with small and entire veiny leaves, and purplish or whitish flowers.

10. *SATUREJA*. *Calyx* tubular, ten-ribbed. *Corolla* bilabiate; *segments* nearly equal. *Stamens* diverging, scarcely exserted.—Perennials.

11. *HYSSOPUS*. *Calyx* tubular, fifteen-nerved, equal or oblique, with five equal teeth; naked inside. *Corolla* with the tube as long as the calyx; the upper lip flat, erect, emarginate; the lower spreading trifid, and the middle segment the largest. *Stamens* four, didynamous, exserted, diverging; *anthers* with linear divaricating cells.—Perennial.

12. *COLLINSONIA*. *Calyx* ovate, declined in fruit, two-lipped; upper lip truncate, three-toothed, the lower two-toothed. *Corolla* elongated, expanded at the throat, somewhat two-lipped, with the four upper lobes nearly equal, but the lower larger and longer, pendent, toothed or lacerated. *Stamens* two, rarely three or four, much exserted, diverging; *anther-cells* divergent.—Strong-scented perennials, with large ovate leaves, and yellowish flowers on slender pedicels, in loose and panicked terminal racemes.

13. *CUNILA*. *Calyx* ovate-tubular, ten-ribbed, equally five-toothed, hairy in the throat. *Corolla* two-lipped; upper lip erect, flattish, mostly

emarginate; the lower spreading, somewhat equally three-cleft. *Stamens* two, erect, exserted, distant; no sterile filaments.—Perennials with small white, or purplish flowers, in corymbed cymes or close clusters.

TRIBE V. MELISSINEÆ.

Calyx bilabiate; corolla bilabiate; upper lip straight, lower lip spreading, cleft into three flat lobes, of which the middle one is often broadest. *Stamens* four, sometimes two, ascending.

14. HEDEOMA. *Calyx* ovoid or tubular, gibbous on the lower side near the base, two-lipped, thirteen-ribbed, throat hairy; the upper lip three-toothed, the lower two-cleft. *Corolla* two-lipped; the upper lip erect, flat, notched at the apex; the lower spreading, three-cleft, the lobes nearly equal. *Fertile stamens* two, ascending; the two upper mere sterile filaments or wanting.—Low odorous plants with small leaves, and loose axillary clusters of flowers, somewhat approximated in terminal leafy racemes.

15. MELISSA. *Calyx* slightly gibbous at the base, thirteen-ribbed, open, more or less hairy in the throat; the upper lip three-toothed, the lower bifid. *Corolla* with a recurved-ascending tube, the upper lip erect, flattish, lower lip spreading, three-lobed, the middle lobe mostly broadest.—*Stamens* four, ascending; *anther-cells* divergent.—Fragrant plants, with loose, one-sided, few-flowered clusters, with few and mostly ovate bracts, resembling the leaves.

TRIBE VI. SCUTELLARINEÆ.

Calyx bilabiate, upper lip truncate. Corolla bilabiate, upper lip vaulted, tube ascending, exserted. *Stamens* four, ascending beneath the upper lip of the corolla.

16. SCUTELLARIA. *Calyx* campanulate, gibbous, bilabiate, the lips entire; upper one consisting of the two lateral sepals, deciduous after flowering, when the calyx is closed by the arched and separate upper sepal applied to the lower lip like a lid. *Corolla* with an elongated tube, dilated at the throat; the upper lip arched, entire or nearly so; the middle lobe of the lower dilated and spreading, convex, its lateral lobes often connected with the upper lip. *Stamens* four, ascending under the upper lip; *anthers* approximate in pairs, ciliate; those of the lower stamens halved, of the upper, two-celled and heart-shaped.—Perennial bitter herbs, not aromatic, with axillary, or else spiked or racemed flowers; the short peduncles chiefly opposite, one-flowered, often one-sided.

TRIBE VII. NEPETEÆ.

Calyx oblique, upper teeth longer. Corolla bilabiate, upper lip vaulted, lower spreading, throat mostly inflated. Stamens ascending or diverging, the upper pair longer.

17. NEPETA. *Calyx* tubular, often incurved, arid, thirteen to fifteen-nerved, obliquely five-toothed, seldom equal at the orifice. *Corolla* with the tube slender at the base, naked and dilated in the throat; the upper lip erect, rather concave, notched or two-cleft; the lower spreading, three-cleft, the middle lobe largest, and crenate. *Stamens* four, didynamous, ascending under the upper lip, the lower pair shorter; *anthers* usually approximate in pairs, the cells divergent and finally divaricating.—Perennial herbs.

TRIBE VIII. STACHYDEÆ.

Calyx oblique or rarely sub-bilabiate, three to ten-toothed. Corolla bilabiate, upper lip galeate or flat, lower lip unequally three-lobed. Stamens ascending, upper pair shorter.

18. LEONURUS. *Calyx* turbinate, five-nerved, the mouth truncated, with nearly five equal teeth which are awl-shaped, and when old rather spiny at the point and spreading. *Corolla* with the tube inclosed, naked, or obliquely ringed inside; upper lip oblong, entire, hairy, somewhat arched; the lower spreading, three-lobed; the middle lobe larger, broad and inversely heart-shaped; the lateral oblong. *Stamens* four, didynamous, ascending under the upper lip; *anthers* approximate in pairs, with parallel transverse and naked valves, sprinkled with shining dots. *Achenia* truncate at the apex.—Upright herbs, with cut-lobed leaves, and close whorls of flowers in their axils.

19. MARRUBIUM. *Calyx* tubular, five to ten-nerved, with five or ten subequal acute spiny teeth. *Upper lip of the corolla* erect, flattish or concave, entire or bifid; lower lip spreading, trifid; middle lobe broadest, and generally emarginate. *Stamens* four, included in the tube of the corolla, didynamous; *anther-cells* divergent and somewhat confluent. *Achenia*, obtuse.—Whitish-woolly, bitter-aromatic perennials, branched at the base, with rugose and crenate or cut leaves, the floral nearly similar, and exceeding the whorls.

20. AJUGA. *Corolla* upper lip very short, and two-toothed, or rarely erect and vaulted, lower lip longer. *Stamens* ascending, much exerted; *anthers* all reniform, one-celled. *Achenia* reticulately rugose.

ORDER LXX. PEDALIACEÆ. OIL-SEED.

Herbs mostly strong-scented and glandular hirsute. *Leaves* opposite or alternate, undivided, angular or lobed, exstipulated. *Flowers* axillary, solitary, large, each with two bracts. *Calyx* five-cleft, nearly equal. *Corolla* monopetalous, hypogynous, irregular; the throat ventricose, the limb bilabiate, the lobes somewhat valvate in æstivation. *Disk* hypogynous, fleshy, sometimes glandular. *Stamens* four, with the rudiment of a fifth, didynamous, included; *anthers* two-celled; the *connective* articulated with the filament, a little prolonged beyond the cells, terminated by a gland. *Ovary* seated in the disk, unilocular or bilocular, sometimes with several one or two-seeded spurious cells, formed by the splitting of two placentas and the divergence of their lobes; *ovules* either erect or pendulous, or horizontal, solitary or several; *style* one, *stigma* divided. *Fruit* drupaceous or capsular, valvular, or indehiscent, with from two to eight cells, which, when numerous are usually oligospermous, and polyspermous, when only two. *Seeds* few, large, wingless; *albumen* none; *embryo* straight.

1. SESAMUM. *Calyx* five-parted, persistent, upper lobe the smallest. *Corolla* campanulate; *tube* large; *limb* plicate, somewhat bilabiate; upper lobe emarginate, lower the longest, slightly trifid. *Anthers* ovate-oblong; *stigma* lanceolate, bilamellate. *Capsule* oblong, obtusely four-angled, four-grooved, two-celled, two-valved, valves recurved. *Seeds* numerous, thick, apterous.—Exotics with mucilaginous leaves, and oily seeds.

ORDER LXXI. BORAGINACEÆ. BORAGE.

Herbs, shrubs, or trees, with round stems and branches. *Leaves* alternate, often rough with stiff hairs, which are scale-like and indurated at base; *stipules* none. *Spikes*, *racemes*, or *corymbs* generally secund, and circinate before flowering, evolving as the flowers expand. *Flowers* of the cyanic series. *Calyx* persistent, with four or five divisions. *Corolla* hypogynous, generally regular, five, rarely four-cleft, with an imbricate æstivation. *Stamens* inserted upon the petals, equal to the number of lobes of the corolla, and alternate with them. *Ovary* four-parted, four-seeded; *ovules* attached to the lowest point of the cavity. *Style* simple, arising from the base of the lobes of the ovary; *stigma* simple or bifid. *Fruit* nuts or achenia, four, distinct, one-seeded. *Seeds* separable from the pericarp, destitute of albumen; *embryo* with a superior radicle; *cotyledons* parallel with the axis, plano-convex, sometimes four.

1. SYMPHYTUM. *Calyx* five-parted. *Corolla* tubular-campanulate, inflated above, five-toothed, the short teeth spreading; the *throat* closed

with five linear awl-shaped scales, converging into a cone. *Stamens* included; *anthers* sagittate, acute, concealed by the valves. *Style* filiform. *Achenia* smooth, ovate, fixed by a large excavated (perforate) base.—Coarse perennial herbs, with thickened mucilaginous roots, and one-sided nodding racemes, either single or in pairs.

2. *ONOSMODIUM*. *Calyx* deeply five-parted, with linear segments. *Corolla* longer than the calyx, subcampanulate, having a ventricose, half five-cleft limb, with the segments converging and the orifice open and naked; the sinuses minutely hooded-inflexed. *Anthers* included, almost sessile, sagittate, apiculate. *Style* much exserted, smooth. *Achenia* ovoid, smooth, shining, fixed by a flat base, closed.—Perennial herbs with oblong, sessile, nerved leaves, and yellowish-white flowers in terminal and one-sided, at length elongated, erect, spiked racemes, leafy-bracted.

3. *LITHOSPERMUM*. *Calyx* five-parted, persistent, smaller than the corolla. *Corolla* funnel-form or salver-form; the *throat* open, mostly furnished with five small folds or gibbous projections; *lobes* rounded. *Stamens* included; *anthers* oblong, almost sessile; *stigma* obtuse, bifid. *Achenia* ovate, bony, smooth or rugose, fixed by a small truncate base, closed.—Herbs, usually with thickish roots yielding a red-coloring matter, more or less roughish-hairy or downy, and usually sessile leaves, and spiked or racemed leafy-bracted flowers.

4. *MERTENSIA*. *Calyx* short, five-cleft. *Corolla* trumpet-shaped, much longer than the calyx, five-cleft; *throat* naked, or oftener with five small folds or ridges between the insertion of the stamens. *Stamens* inserted at top of the tube, protruding; *anthers* subsagittate; *style* long and filiform. *Achenia* ovoid, smooth or reticulated, rather fleshy, obliquely attached by the prominent internal angle, closed.—Perennials usually smooth, with pale and entire, pellucid-punctate leaves, and handsome purplish-blue, rarely white, flowers in terminal racemes, bractlets above, but one or two leaves at base. Radical leaves many-veined, cauline ones sessile.

5. *CYNOGLOSSUM*. *Calyx* five-parted. *Corolla* funnel-form, about as long as the calyx, vaulted; the *throat* closed by five converging, convex, obtuse scales; the *lobes* rounded. *Stamens* included. *Achenia* depressed or convex, fixed laterally to the base of the style, covered with short hooked prickles.—Coarse herbs, with a strong, unpleasant scent, and mostly panicled racemes which are naked above but usually bracted at the base; lower leaves petioled. Flowers blue, purple or white.

ORDER LXXII. POLEMONIACEÆ. GREEK VALERIAN.

Herbs with opposite, occasionally alternate, compound, or simple leaves; stem occasionally climbing. *Calyx* five united sepals, inferior, persistent, sometimes irregular. *Corolla* five united petals, regular, the lobes imbricate or twisted in æstivation. *Stamens* five, inserted into the middle of the corolla tube, and alternate with its lobes. *Ovary* free, three-celled, with few or many ovules; *styles* united into one; *stigma* trifid; *ovules* ascending or peltate. *Capsule* three-celled, three-valved, few or many-seeded, with a loculicidal or septicidal dehiscence; the valves separating from the axis. *Seeds* angular or oval, or winged, often enveloped in mucus, ascending; *albumen* horny; *embryo* straight; *cotyledons* elliptical, foliaceous.

1. POLEMONIUM. *Calyx* campanulate, five-cleft. *Corolla* rotate-campanulate; *limb* five-lobed, erect; *tube* short, closed at the base by five stamiferous valves. *Stamens* equally inserted at the summit of the very short corolla-tube; *filaments* slender, declined, hairy-appendaged at the base. *Capsule* few to many-seeded.—Low branching herbs, with alternate, pinnate leaves, the upper leaflets sometimes confluent; the blue or white, terminal, corymbose flowers nearly bractless.

ORDER LXXIII. CONVULVULACEÆ. BINDWEED.

Herbs or shrubs, mostly twining, sometimes erect, smooth or with a simple pubescence, with a milky juice. *Leaves* alternate, undivided or lobed, seldom pinnatifid, without stipules. *Flowers* showy, axillary or terminal. *Calyx* of five sepals, usually united at base, much imbricated, as if in more whorls than one, often very unequal, persistent. *Corolla* hypogynous, regular, deciduous; the limb five-lobed or entire, plaited, twisted in æstivation. *Stamens* five, inserted into the base of the corolla, and alternate with its lobes. *Ovary* simple, with two or four cells, seldom one; the *ovules* definite and erect, when more than one collateral. *Styles* united into one; *stigmas* obtuse or acute. *Disk* annular, hypogynous. *Fruit* a capsule, one to four-celled, valves with septifragal dehiscence. *Seeds* few, large, with thin mucilaginous albumen; *embryo* curved; *cotyledons* shriveled; *radicle* inferior.

1. CONVULVULUS. *Calyx* five-parted, naked or with two small bracts near the base. *Corolla* campanulate or funnel-form, with a spreading, nearly entire or five-lobed border. *Stamens* shorter than the corolla-limb, rarely a little longer, included. *Style* simple; *stigmas* two, linear-cylindrical, often revolute. *Capsule* valvate, two to four-celled, four to six-seeded.—Chiefly twining or trailing plants, with the axillary peduncles one or many-flowered.

2. *IPOMÆA*. *Sepals* five. *Corolla* campanulate. *Stamens* included. *Style* one. *Stigma* capitate, often bilobate. *Ovary* bilocular; *cells* with two ovules. *Capsule* two-celled.

ORDER LXXIV. SOLANACEÆ. NIGHTSHADE.

Herbaceous plants or shrubs, with a colorless juice, and alternate, undivided or lobed, sometimes collateral *leaves*; the floral ones sometimes double, and placed near each other. *Inflorescence* often supra-axillary; *pedicels* bractless. *Calyx* five, seldom four-parted, more or less united, mostly persistent. *Corolla* regular, hypogynous; the *limb* five-cleft, seldom four, deciduous, plaited in æstivation, sometimes imbricated. *Stamens* four or five, sometimes one abortive, inserted on the corolla, as many as the segments of the limb, and alternate with them; *anthers* bursting longitudinally, rarely by pores at the apex. *Ovary* superior, two-celled, rarely four or many-celled, with the placenta in the axis; *styles* and *stigmas* united into one. *Fruit* a capsule with a double dissepiment parallel with the valves, or a berry with the placenta adhering to the dissepiment. *Seeds* numerous, sessile; *embryo* straight or curved, often out of the center, lying in a fleshy *albumen*; *radicle* next the hilum.

1. *NICOTIANA*. *Calyx* tubular-campanulate, five-cleft. *Corolla* funnel-form, usually with a long tube, regular, the plaited border five-lobed. *Stamens* five, declinate. *Stigma* capitate, emarginate. *Capsule* two-celled, two or four-valved from the apex, opening by four points.—Rank acrid-narcotic herbs, mostly clammy-pubescent, with large, entire leaves, and lurid, racemed or panicled flowers, white, tinged with green or purple.

2. *DATURA*. *Calyx* large, tubular, ventricose, five-angled, five-toothed, separating transversely above the persistent, orbicular, peltate base in fruit. *Corolla* funnel-form, with a large and spreading five-toothed plaited border. *Stamens* five, equal; *stigma* thick, obtuse, bilamellar. *Capsule* globular, smooth or prickly, four-valved, two-celled, with two thick placenta projected from the axis into the middle of the cells, thence connected with the walls by an imperfect false partition, so that the pod is four-celled except near the top, with the placenta seemingly borne on the middle of the alternate partitions. *Seeds* numerous, black, rather large.—Rank narcotic annual weeds, with an unpleasant odor when bruised, bearing ovate, angular-toothed leaves, and large bluish-white or purple, solitary, axillary flowers, on short peduncles.

3. *HYOSCYAMUS*. *Calyx* campanulate or urceolate, five-lobed, persistent. *Corolla* funnel-form; *limb* spreading, oblique, five-lobed, une-

qual; one of the lobes larger. *Stamens* five, declinate; *stigma* capitate. *Capsule* ovate, compressed, two-celled, covered by the persistent calyx, furrowed on each side; opening transversely all round near the apex which falls off like a lid.—Coarse, clammy-pubescent, rank, narcotic herbs, with lurid flowers in the axils of angled or toothed leaves.

4. *PHYSALIS*. *Calyx* five-cleft, persistent, reticulated and enlarging after flowering, at length much inflated and inclosing the berry. *Corolla* rotate-campanulate; *tube* very short, marked with five concave spots at the base; *limb* plaited, obscurely five-lobed. *Stamens* five, connivent; *anthers* opening longitudinally. *Stigma* capitate. *Berry* globular, smooth, two-celled, covered with the five-angular, membranous, inflated, colored calyx.—Herbs, rarely shrubs, with axillary or supra-axillary flowers.

5. *CAPSICUM*. *Calyx* erect, five-cleft, persistent. *Corolla* rotate; *tube* very short; *limb* plaited, five-lobed. *Stamens* five, with converging *anthers*, which are two-celled, dehiscing by fissures, longitudinally. *Fruit* a dry, coriaceous berry, two to four-celled, inflated, many-seeded. *Seeds* flat, naked, very acrid.—A large genus of herbaceous or shrubby plants, pervaded by a heating, acrid principle; leaves often in pairs; peduncles axillary, solitary.

6. *SOLANUM*. *Calyx* chiefly five-parted, sometimes ten, spreading, persistent. *Corolla* rotate, subcampanulate; *tube* very short; *limb* plicate, five to ten-lobed. *Stamens* exerted, converging around the style; filaments very short; *anthers* erect, slightly cohering or connivent, opening at the apex by two pores. *Berry* subglobose or depressed, often torose, two to six-celled, many-seeded.—Herbs or shrubs, unarmed or prickly. Leaves sometimes geminate, pinnatifid or undivided. Peduncles solitary or several, one or many-flowered.

7. *ATROPA*. *Calyx* campanulate, five-cleft, persistent, nearly equal. *Corolla* campanulate, twice as long as the calyx; *tube* short; *limb* with five shallow nearly equal segments. *Stamens* five, distant; *filaments*, filiform, incurved, nearly as long as the tube of the corolla; *anthers* cordate, four-lobed. *Stigma* capitate. *Berry* two-celled, globular, many-seeded, subtended by the enlarged calyx.—Narcotic herbs, shrubs or trees. Exotics.

LXXV. GENTIANACEÆ. GENTIANS.

Herbs rarely shrubs, generally smooth, sometimes twining, with a watery juice. *Leaves* opposite, entire, smooth, exstipulated, sessile, or having their petioles confluent in a little sheath, in most cases three to

five-ribbed ; very rarely brown, scale-like, or alternate. *Flowers* conspicuous, terminal or axillary, regular, or sometimes irregular. *Calyx* monophyllous, four to ten-cleft, united at base, persistent. *Corolla* usually regular and persistent, hypogynous; the *limb* divided into as many lobes as there are sepals, with an imbricated twisted æstivation. *Stamens* inserted on the tube of the corolla, alternate with its segments, and equal in number to them; some of them occasionally abortive. *Pollen* three-lobed or triple. *Ovary* single, one-celled, sometimes rendered apparently two-celled by the introflexed placentæ. *Style* one, continuous or none; *stigmas* one or two. *Capsule* or *berry* many-seeded, with one or two cells, usually two-valved; the margins of the valves turned inward, and in the genera with one cell, bearing the seeds; in the two-celled genera inserted into a central placenta. *Seeds* small; *testa* single; *embryo* minute, straight in the axis of soft fleshy albumen; *radicle* next the hilum.

SUB-ORDER I. GENTIANÆ. GENTIAN.

Corolla imbricate from right to left in æstivation. Testa of the seed membranaceous. Leaves opposite.

1. *SABBATIA*. *Calyx* five to twelve-parted, rarely five-cleft, the divisions slender. *Corolla* rotate, regular, five to twelve-parted, withering on the capsule. *Stamens* five to twelve, inserted in the throat of the tube; *anthers* erect, at length recurved, two-celled, spirally twisted after shedding the pollen. *Ovary* superior, ovate; *style* distinct, declining, bifid; *stigmas* capitate, ascending, with two arms which become spirally twisted. *Capsule* bivalve, septicidal, somewhat two-celled; *valves* a little introflexed; *seeds* numerous, small.—Biennials with slender stems, and cymose-panicled, white or rose-purple flowers.

2. *GENTIANA*. *Calyx* four or five-cleft or parted. *Corolla* marescent, funnel-shaped, or campanulate, tubular at base; *limb* four or five or six to eight-parted, regular, usually with intermediate plaited folds which bear appendages at the sinuses; *segments* either spreading, erect, or convergent, entire or ciliated. *Stamens* five, inserted on the corolla tube; *filaments* equal at the base; *anthers* sometimes connate. *Style* short, two-parted, or wanting; *stigmas* two persistent, revolute or erect. *Capsule* oblong, two-valved, one-celled, many-seeded; placentæ united with the endocarp, and overspreading the valves of the capsule.—Herbs of various habit, with opposite leaves, and terminal or cymose flowers.

3. *FRASERA*. *Flowers* mostly tetramerous. *Calyx* deeply four-parted; *segments* connected at base, persistent. *Corolla* deciduous, rotate, deeply four-parted; *segments* elliptical, each with a bearded and

orbicular gland or pit on the upper side. *Stamens* four; *filaments* awl-shaped, usually somewhat connected at base; *anthers* oblong, versatile. *Ovary* one-celled, with a single, persistent *style*, and two, short, distinct *stigmas*. *Capsule* oval, compressed, bivalved, one-celled, partly margined; *seeds* few, large, flat, imbricated, elliptical, with a membranous margin.—Biennials or perennials, tall and showy, with opposite or verticillate leaves, and numerous peduncled flowers in open cymes.

SUB-ORDER II. MENYANTHÆ. BUCKBEAN.

Æstivation of the corolla induplicate. Aquatic or marsh herbs. Sheaths of the leaves alternate.

4. MENYANTHES. *Calyx* five-parted, tubular below. *Corolla* short funnel-form, fleshy, deciduous, the whole upper surface white-bearded; *limb* spreading, five-lobed, equal. *Stamens* five, inserted on the corolla; *filaments* distinct; *anthers* erect. *Ovary* surrounded by five hypogynous glands; *style* filiform, persistent; *stigma* capitate bifid. *Capsule* one-celled, somewhat one-valved, many-seeded, bursting somewhat irregularly; *testa* hard, smooth, and shining.—Perennial, with a thickish, creeping rootstock, sheathed by the membranous bases of the long petioles, which bear three oval or oblong leaflets at the summit; flowers white or slightly reddish, racemed on the naked scape.

ORDER LXXVI. APOCYNACEÆ. DOGBANE.

Trees, shrubs, and herbs, usually with a milky juice. *Leaves* opposite, sometimes whorled, seldom scattered, quite entire, often having ciliæ or glands upon the petioles, but without stipules. *Calyx* free, persistent, five-parted. *Corolla* hypogynous, regular, five-lobed, often with scales at the mouth, deciduous; *æstivation* twisted. *Stamens* five, arising from the corolla and alternate with its segments; *filaments* distinct; *anthers* three-celled, opening lengthwise, sometimes slightly connected. *Pollen* granular, globose, or three-lobed, immediately applied to the stigma. *Ovaries* two, distinct or rarely united; *styles* two or united; *stigmas* united into one which is common to both styles. *Fruit* a follicle, capsule, drupe, or berry, double or single. *Seeds* numerous, pendulous, with fleshy or cartilaginous albumen; *embryo* foliaceous; *plumule* inconspicuous; *radicle* turned toward the hilum.

1. APOCYNUM. *Calyx* five-parted, lobes acute. *Corolla* campanulate, short, with five revolute lobes, furnished at base with five glandular teeth alternating with the stamens. *Stamens* inserted at the base of the corolla; *filaments* ligulate; *anthers* sagittate, connivent, longer than the filaments, and slightly cohering by their inner face to the stigma; their posterior lobes destitute of pollen. *Hypogynous scales* five. *Ovaries* two; *stigma* sessile, dilated, with a conical and bilobiate apex. *Follicles*

long, slender, distinct. *Seeds* provided with a long tuft of silky down at the apex, (*comose*).—Perennial herbs, not climbing, with mucronate-pointed, opposite leaves, a tough fibrous bark, and small and pale cymose flowers on short pedicels.

2. *STRYCHNOS*. Some authors place this in order, *Loganiaceæ*, and sub-order, *Strychneæ*. *Calyx* four or five-parted. *Corolla* tubular, with a spreading, four or five-parted limb, and a valvate æstivation. *Stamens* four or five, inserted on the throat of the corolla, which is either naked or bearded. *Ovary* two-celled; *style* single; *stigma* capitate; *ovules* indefinite, attached to a central placenta. *Berry* corticated, one-celled, many-seeded, or by abortion one-seeded. *Seeds* nidulant, discoidal; *albumen* large, cartilaginous, almost divided into two plates. *Embryo* with leafy cotyledons.—Exotic.

3. *GELSEMINUM*. *Calyx* very small, five-sepalled. *Corolla* funnel-form; *limb* spreading, five-lobed, nearly equal. *Capsule* compressed, flat, two-partible, two-celled; *seeds* flat, attached to the margins of the valves.—Southern perennial twining herbs, with smooth stems, opposite, entire, lanceolate leaves, and short petioles. It is nearly allied to *Bignonia*, and probably should be placed in *Bignoniaceæ*.

ORDER LXXVII. ASCLEPIADACEÆ. MILK-WEED.

Herbs or shrubs, with a milky juice, and often twining. *Leaves* entire, mostly opposite, exstipulate, rarely alternate or whorled, having ciliæ between their petioles. *Flowers* sub-umbelled, fascicled, or racemose, proceeding from between the petioles. *Calyx* five-divided, persistent. *Corolla* hypogynous, five-lobed, regular, deciduous, generally with imbricate æstivation. *Stamens* five, inserted into the base of the corolla, and alternate with its segments; *filaments* usually connate; *anthers* two-celled, sometimes almost four-celled in consequence of their dissepiments being nearly complete. *Pollen* at the period of the dehiscence of the anther cohering in masses equal in number to the cells, or occasionally cohering in pairs and sticking to the five processes of the stigma, either by twos, by fours, or singly. *Ovaries* two; *styles* two, approximate, often short; *stigma* common to both styles, dilated, five-angled, with corpusculiferous corners. *Follicles* two, one often abortive. *Placenta* attached to the suture, but finally separating. *Seeds* numerous, pendulous, imbricated, almost always comose at the hilum. *Albumen* thin; *embryo* straight; *cotyledons* foliaceous; *radicle* superior; *plumule* inconspicuous.

1. *ASCLEPIAS*. *Calyx* five-parted, persistent, the divisions small, spreading. *Corolla* rotate, deeply five-cleft, valvate in the bud, finally reflexed, deciduous. *Staminal crown* of five-lobes, seated on the tube of stamens;

leaflets cucullate, fleshy, erect, opposite the anthers, with an averted, horn-like process from the base, curved toward the stigma. *Filaments* united in a tube (*gynostegium*) which incloses the pistil; *antheridium* (connate mass of anthers) five-angled, truncate, opening by five longitudinal fissures. *Pollinia* (masses of pollen) five distinct pairs, fixed by the attenuated apex, pendulous. *Follicles* two, one often abortive, soft, ovate or lanceolate; *seeds* comose.—Perennial upright herbs with thick and deep roots; leaves opposite, verticillate, rarely alternate, usually transversely veiny; umbels between the petioles.

2. HEMIDESMUS. *Calyx* five-parted. *Corolla* rotate, with coriaceous segments, and five rounded, thick scales in the throat of the tube below the sinuses. *Filaments* connate at base, inserted in the tube, distinct above; *anthers* cohering separate from the stigma, beardless, simple at the point. *Pollen-masses* twenty, granular, attached in fours to a solitary reniform appendage of each corpuscle. *Stigma* flattish, pointless, pentagonal, stellate. *Follicles* cylindrical, very much divaricating, smooth. *Seeds* comose.—Exotic twining plants.

ORDER LXXVIII. OLEACEÆ. OLIVES.

Trees and shrubs, with *branches* usually dichotomous, and ending abruptly by a conspicuous bud. *Leaves* opposite, simple, sometimes pinnate. *Flowers* perfect, sometimes dicecious, in terminal or axillary racemes or panicles; the *pedicels* opposite, with single bracts. *Calyx* inferior, generally divided into four parts, persistent. *Corolla* monopetalous, hypogynous, four-cleft, sometimes distinct but connected in pairs by the filaments, occasionally apetalous, valvate in æstivation. *Stamens* two, alternate with the petals or segments; *anthers* two-celled, opening longitudinally. *Ovary* simple, without any hypogynous disk, two-celled; *cells* two-seeded; *ovules* in pairs, pendulous, collateral; *style* one or wanting; *stigma* entire or bifid. *Fruit* drupaceous, berried or capsular, often one-seeded by abortion. *Seeds* with dense, fleshy, abundant albumen; *embryo* about half its length, straight; *cotyledons* foliaceous, partly asunder; *radicle* superior; *plumule* inconspicuous.

1. LIGUSTRUM. *Calyx* short, tubular, minutely four-toothed, deciduous. *Corolla* funnel-form, four-lobed, the lobes ovate, obtuse; *tube* short. *Stamens* two, on the tube of the corolla, included. *Style* very short; *stigma* two-cleft. *Berry* spherical, two-celled, two to four-seeded; *seeds* convex on one side, angular on the other.—Shrubs with entire leaves on short petioles, and small white flowers in terminal thyrsoid panicles.

2. OLEA. *Calyx* short, four-toothed. *Corolla* short, rotate or hypocrateriform, with a flat four-parted limb. *Stamens* two, rather projecting.

Ovary bilocular; *style* very short; *stigma* bifid, with emarginate segments. *Drupe* baccate, oleo-carneous, two-celled, one of the cells usually abortive.

3. ORNUS. *Calyx* very small, four-cleft. *Corolla* divided to the base into linear segments. *Pericarp* a winged key not dehiscing.

4. FRAXINUS. *Flowers* polygamous or dioecious. *Calyx* small and four-cleft, or wanting. *Petals* four, slightly cohering in pairs at the base, or only two, oblong or linear, or wanting. *Stamens* two, sometimes three, rarely four. *Style* single; *stigma* bifid. *Fruit* a one or two-celled samara, or key, orbicular, compressed, winged at the apex, one or two-seeded, not dehiscing; *cotyledons* elliptical; *radicle* slender.—Light timber trees, with petioled unequally pinnate leaves, and small flowers in crowded panicles or racemes, from the axils of the last year's leaves.

SUB-CLASS III. APETALOUS PLANTS.

Corolla none; the floral envelopes consisting of a single series of organs (calyx) only; or sometimes wholly wanting.

ORDER LXXIX. ARISTOLOCHIACEÆ. BIRTHWORT.

Herbaceous or shrubby plants, the latter often climbing; *wood* without concentric layers. *Leaves* alternate, simple, petiolate, often with a stipule opposite the leaf, or exstipulate. *Flowers* perfect, axillary, solitary, brown, or of some dull color. *Calyx* superior, tubular, segments three, valvate in æstivation, sometimes regular, sometimes very unequal. *Corolla* wanting. *Stamens* six to twelve, epigynous, distinct or adhering to the style and stigmas. *Ovary* inferior, three or six-celled; *ovules* numerous, horizontally attached to the axis; *style* simple; *stigmas* radiating, as numerous as the cells of the ovary. *Fruit* capsule or berry, three or six-celled, many-seeded. *Seeds* with a very minute embryo placed in the base of fleshy albumen, anatropous.

1. ASARUM. *Calyx* campanulate, coriaceous, colored, permanent; *limb* in three rather deep, upright segments, with incurved points. *Stamens* twelve, inserted on the ovary; *filaments* awl-shaped, half the length of the calyx; *anthers* short, each of two round, separated cells, adnate to the middle of the filaments on the inner side. *Ovary* turbinate; *styles* columnar, furrowed, nearly as long as the stamens; *stigma* in six deep, stellate, recurved segments. *Capsule* coriaceous, globular, six-celled, crowned with the calyx; *seeds* several in each cell, obovate, with a pale longitudinal crest.—Stemless herbs, with aromatic-pungent, creeping, matted rootstocks, bearing a terminal nodding flower close to the ground, between the long petioles of a pair of cordate-reniform, and veiný, deciduous leaves.

2. *ARISTOLOCHIA*. *Calyx* superior, tubular, colored, permanent; tumid and nearly globose, at the base; *limb* dilated; either lobed and equally spreading, or unilateral and undivided. *Stamens* six; *filaments* consolidated into a notched cup, crowning the ovary within the calyx; *anthers* six, sessile on the outer surface of the cup, each of two oblong, separated, parallel, bivalve cells. *Ovary* inferior, oblong, angular. *Style* scarcely any. *Stigma* nearly globular, with six deep lobes; the summit concave. *Capsule* with six angles, six cells, and six valves, with double partitions from their inflexed margins. *Seeds* numerous in each cell, depressed, horizontal, lying over each other, triangular, with a dilated or thickened winged margin.—Twining, climbing, or erect perennial herbs or shrubs, with alternate leaves, and lateral or axillary greenish or lurid-purple flowers.

ORDER LXXX. CHENOPODIACEÆ. GOOSEFOOT.

Herbs or undershrubs, with alternate, occasionally opposite *leaves*, without stipules. *Flowers* small, perfect, often dicecious or polygamous. *Calyx* deeply divided, sometimes tubular at base, persistent, imbricate in æstivation. *Stamens* inserted into the base of the calyx, opposite its segments, and equal to them in number, or fewer. *Ovary* single, superior, or occasionally adhering to the tube of the calyx, with one *ovule* attached to the base of the cavity; *style* in two or four divisions, rarely simple; *stigmas* undivided. *Fruit* a utricle. *Embryo* curved round farinaceous albumen, or spiral, or doubled together without albumen; *radicle* next the hilum; *plumule* inconspicuous.

1. *CHENOPODIUM*. *Flowers* perfect, all bractless. *Calyx* five-parted, obtusely five-angled; *segments* ovate, concave, persistent, membranous at the edges; not appendaged or becoming succulent, more or less enveloping the depressed fruit. *Stamens* five, opposite the calyx-lobes; *filaments* subulate; *anthers* of two round lobes. *Ovary* orbicular, depressed; *styles* two, rarely three, short; *stigmas* obtuse. *Seed* solitary, lenticular, horizontal, crustaceous, enveloped in a very thin, membranous, close *utricle*, and covered by the permanent calyx.—Smooth weeds, mostly annual, and more or less covered with a white mealiness; the leaves alternate, petioled, triangular or rhombic, toothed or entire. Flowers sessile in small clusters collected in spiked panicles.

ORDER LXXXI. AMARANTHACEÆ. AMARANTH.

Herbs or shrubs with opposite or alternate, exstipulate, *leaves*. *Flowers* in heads or spikes, usually colored, generally perfect. *Pubescence* simple, the hairs divided by internal partitions. *Calyx* three or five-leaved, hypogynous, scarious, persistent, occasionally with two bractlets at the

base, and generally immersed in dry colored bracts. *Stamens* hypogynous, either five, or some multiple of that number, distinct or monadelphous, occasionally abortive; *anthers* two or one-celled. *Ovary* superior, single, one or few-seeded; the *ovules* hanging from a free central funiculus; *style* one or none; *stigma* simple or compound. *Fruit* a membranous utricle. *Seeds* lentiform, pendulous; *testa* crustaceous; *albumen* central, farinaceous; *embryo* curved round the circumference; *radicle* next the hilum; *plumule* inconspicuous.

1. AMARANTHUS. *Flowers* monœcious or polygamous, rarely dioecious, three-bracted. *Calyx* deeply three to five-parted, mostly colored, persistent; *segments* lanceolate, acute. *Stamens* three to five, separate; *anthers* two-celled. *Styles* or *stigmas* two or three, occasionally four, thread-like. *Utricle* one-celled, one-seeded, circumscissile or indehiscent.—Chiefly annual herbs, with alternate and entire, petioled leaves, and minute spiked-clustered flowers, axillary and terminal; bracts and calyx green or purple.

ORDER LXXXII. POLYGONACEÆ. BUCKWHEAT.

Herbs rarely shrubs, with alternate *leaves*. *Stipules* of that remarkable kind called Ochreæ, cohering round the stem in the form of a sheath above the base of the leaf-stalks; occasionally wanting. *Flowers* mostly perfect, and in racemes. *Calyx* inferior, divided; *sepals* united at base, imbricate in æstivation. *Stamens* definite, inserted on the calyx near the base; *anthers* dehiscing longitudinally. *Ovary* superior, with a single erect *ovule*; *styles* or *stigmas* several. *Fruit* an achenium, usually triangular, naked, or protected by the calyx. *Seed* solitary, erect, orthotropous; *embryo* curved or straightish, on the outside of the albumen, or rarely in its center; *radicle* pointing from the hilum and toward the apex of the dry seed-like fruit; *plumule* inconspicuous.

1. RHEUM. *Calyx* petaloid, six-parted, marescent. *Stamens* about nine, inserted on the base of the calyx. *Styles* three, reflexed. *Stigmas* peltate, entire. *Fruit* a triangular, winged achenium, with the withered calyx at the base. *Embryo* in the center of the albumen.—Perennials, with flowers fasciculate, in racemose panicles.

2. POLYGONUM. *Calyx* turbinate, colored, with five deep, ovate, obtuse, persistent segments. *Stamens* four to nine, very short, subulate; *anthers* roundish, incumbent. *Ovary* roundish, either triangular or compressed; *styles* usually three; in those with a compressed ovary only two, filiform, short, in some species partly combined; *stigmas* simple. *Nut* or *achenium* solitary, triangular or compressed, pointed. *Embryo* placed in a groove on the outside of the albumen, and curved half-way

around it; *radicle* and usually the *cotyledons* slender.—Herbs, with jointed stems and pedicels; flowers in axillary and terminal fascicles, and spikes or paniculate racemes.

3. RUMEX. *Calyx* of three, obtuse, spreading, persistent, external sepals, more or less combined at the bottom, and of three ovate, larger, internal ones, similar in color, but thinner in texture, and more veiny; subsequently enlarged, converging round the fruit, and permanent, bearing, in some species, a dorsal grain or tubercle. *Stamens* six; *filaments* capillary, very short; *anthers* erect, oblong, of two-lobes. *Ovary* triangular, rather turbinate; sometimes in a separate flower. *Styles* capillary, spreading, protruding between the petals. *Stigmas* large, in many fine tufted segments. *Nut* inclosed within the interior, enlarged, closed sepals, triangular, polished, with three sharp edges. *Embryo* slightly curved, lying along one side of the albumen, slender.—Coarse herbs with small homely (mostly green) flowers, commonly whorled in panicled racemes; petioles somewhat sheathing at the base.

ORDER LXXXIII. PHYTOLACCACEÆ. POKEWEED.

Herbs or undershrubs, with alternate, entire, exstipulate leaves, often with pellucid dots. *Flowers* racemose, perfect. *Calyx* of four or five petaloid leaves, imbricated. *Stamens* four or five, and alternate with the sepals, or indefinite; *anthers* two-celled with a longitudinal dehiscence. *Ovary* one or several-celled, each cell containing one ascending *ovule*, either amphitropal or campylotropal; *styles* and *stigmas* equal in number to the cells. *Fruit* baccate or dry, entire or deeply-lobed, one or many-celled, indehiscent. *Seeds* solitary, ascending, with a cylindrical *embryo*, curved round mealy albumen; *radicle* next the hilum.

1. PHYTOLACCA. *Calyx* of five-rounded, petaloid sepals. *Stamens* five to thirty, usually ten. *Ovary* of five to twelve cells or carpels, united in a ring, with as many short separate styles; in *fruit* forming a depressed, globose, furrowed, five to twelve-celled berry, covered with a succulent pulp, and with a single vertical seed in each cell. *Embryo* curved in a ring round the albumen.—Tall and stout perennial herbs, with large petioled leaves, and flowers in racemes which, by the axillary prolongation of the stem, become lateral and opposite the leaves.

ORDER LXXXIV. LAURACEÆ. LAURELS.

Trees and shrubs with alternate, exstipulate, seldom opposite, entire, or very rarely lobed leaves; flowers umbelled or panicled. *Calyx* four to six-cleft, with imbricated æstivation, the limb sometimes wanting. *Stamens* definite, perigynous, opposite the segments of the calyx, and generally twice as numerous; the three innermost sterile or wanting;

the six outermost scarcely ever abortive; *anthers* adnate, two to four-celled; the cells bursting by a longitudinal persistent valve from the base to the apex; the outer anthers valved inward; the inner valved either outward or inward. *Glands* usually present at the base of the inner filaments. *Ovary* single, superior, with one or two single pendulous ovules; *style* simple; *stigma* obtuse, two or three-lobed. *Fruit* berry or drupe, naked or covered, often on a thickened pedicel. *Seeds* exalbuminous; *embryo* inverted; *cotyledons* large, plano-convex, peltate near the base; *radicle* very short, included, superior; *plumule* conspicuous, two-leaved.

1. BENZOIN. *Flowers* polygamous, involucreted. Males; *calyx* six-parted, with equal, permanent segments. *Stamens* nine, in three rows, fertile; *anthers* ovate, two-celled, introrse. *Glands* six to nine in two or three rows, with a reniform, compressed head, alternate either with the stamens of the second and third row, or with those of the first and second row, added obliquely to the third row. Females; *flowers* smaller than the male, with twelve to eighteen sterile stamens, among which spathulate bodies are dispersed. *Style* short and thick. *Drupe* obovoid, succulent, one-seeded, seated on the permanent six-cleft calyx, the pedicel not thickened.—Shrubs with entire, deciduous leaves, and honey-yellow flowers in almost sessile, lateral, umbel-like clusters, appearing before the leaves; the clusters composed of smaller clusters or umbels of four or six flowers, surrounded by an involucre of deciduous scales.

2. SASSAFRAS. *Flowers* diœcious. *Calyx* six-parted, membranous; *segments* equal, permanent at the base. Males; *stamens* nine, fertile, inserted on the base of the calyx in three rows, the three inner with double-stalked distinct glands at the base of each; *anthers* linear, four-celled, four-valved, cells looking inward. Females; with as many stamens as the male, or fewer, sterile; the inner often confluent. *Style* filiform. *Drupe* superior, ovoid, succulent, one-seeded, supported on a club-shaped, fleshy pedicel.—Trees with spicy-aromatic bark, very mucilaginous twigs and foliage, the latter deciduous and often lobed. *Flowers* greenish-yellow, in clustered and peduncled corymbed racemes, appearing with the leaves.

3. LAURUS. *Flowers* diœcious, or perfect, involucreted. *Calyx* four-parted; *segments* equal, deciduous. Males; *stamens* fertile, twelve in three rows; the outermost alternate with the segments of the calyx; all with two glands in the middle or above it; *anthers* oblong, two-celled, all looking inward. Females; with two to four sterile *stamens* around the ovary; *stigma* capitate. *Fruit* succulent, seated in the irregular

base of the calyx.—Evergreen shrubs with axillary, stalked umbels; leaf-buds with valvate papery scales.

4. CAMPHORA. *Flowers* perfect, paniced, naked. *Calyx* six-cleft, papery, with a deciduous limb. *Fertile stamens* nine, in three rows; the inner with two-stalked, compressed glands at base; *anthers* four-celled; the outer introrse, the inner extrorse. *Sterile stamens* three, shaped like the first, placed in a whorl, and alternating with the stamens of the second row; three others, stalked, with an ovate-glandular head. *Fruit* placed on the obconical base of the calyx.—Large trees with triple-nerved leaves, having glands in the axils of the principal veins; leaf-buds scaly.

5. CINNAMOMUM. *Flowers* perfect or polygamous, paniced or fascicled, naked. *Calyx* six-cleft; the limb deciduous. *Fertile stamens* nine, in three rows; the three inner with two sessile glands at the base; *anthers* four-celled, the three inner extrorse. Three capitate abortive stamens next the center. *Fruit* seated in a cup-like calyx.—Plants having strongly-ribbed leaves; leaf-buds not scaly.

6. NECTANDRA. *Flowers* perfect. *Calyx* six-parted, rotate; segments deciduous, the three outer rather the broadest. *Anthers* nine, ovate, nearly sessile, with four cells arranged in a curve, and distinct from the tip of the anther; cells of the interior anthers inverted. *Glands* in pairs, globose, sessile, at the base of the three interior stamens next their back. *Sterile stamens* either tooth-shaped and biglandular at the base, or eglandular and then with a small oval head. *Fruit* succulent, more or less immersed in the tube of the calyx changed into a truncated cup.—Flowers paniced or corymbose, axillary, lax, pretty ample.

ORDER LXXXV. THYMELACEÆ. MEZEREUM.

Shrubs with a very tenacious bark, and entire, opposite or alternate, exstipulate leaves. *Flowers* perfect, capitate or spiked, terminal or axillary, occasionally solitary. *Calyx* tubular, colored; the limb four, seldom five-cleft, with an imbricated æstivation. *Corolla* none, or sometimes scale-like petals in the orifice of the calyx. *Stamens* definite, inserted in the tube, generally eight, sometimes four, rarely two; when equal in number to the segments of the calyx or fewer, opposite to them; *anthers* two-celled, dehiscing lengthwise in the middle. *Ovary* solitary, with one pendulous ovule; *style* one; *stigma* undivided. *Fruit* hard, dry, and nut-like, or drupaceous. *Albumen* none, or thin and fleshy; *embryo* straight; *cotyledons* plano-convex; *radicle* short, superior; *plumule* inconspicuous.

1. *DIRCA*. *Calyx* petaloid, tubular-funnel-shaped, truncate, the border wavy, or obscurely about four-toothed. *Stamens* eight, unequal, inserted on the calyx above the middle, exserted; *filaments* capillary, the alternate ones longer. *Style* filiform, incurved at the apex; *stigma* capitate. *Drupe* oval, reddish, one-seeded.—A much branched bush, with jointed branchlets, oval-obovate, alternate leaves, at length smooth, deciduous, on very short petioles, the bases of which conceal the buds of the next season. Flowers light-yellow, preceding the leaves, three in a cluster from a dark-hairy bud, from which soon after proceeds a leafy branch.

2. *DAPHNE*. *Calyx* tubular, marescent; *tube* cylindrical, coriaceous, longer than the limb, imperforate at the base, containing the stamens; *limb* in four deep, ovate, spreading, colored segments. *Stamens* eight; *filaments* short, in two rows, inserted on the calyx-tube about the middle; *anthers* roundish, oblong, two-celled, simple, included. *Ovary* ovate; *style* short, terminal; *stigma* capitate, depressed, entire. *Berry* oval, one-celled, one-seeded; *seed* suspended, large, oval, with a thin, brittle skin.—Mostly evergreen shrubs, with leaves generally from the terminal buds, and flowers from the lateral. Exotic.

ORDER LXXXVI. ULMACEÆ. ELM.

Trees and shrubs, with scabrous, alternate, simple, deciduous *leaves*, and two deciduous stipules at the base of each leaf. *Flowers* sometimes by abortion, dioecious, in loose clusters, never in catkins. *Calyx* inferior, campanulate, four or five-cleft, irregular, imbricate in æstivation. *Stamens* definite, inserted on the base of the calyx, as many as its lobes and opposite to them; erect in æstivation. *Ovary* superior, one or two-celled, with a single suspended ovule; *stigmas* two, distinct. *Fruit* one-celled and one-seeded, either a samara or a drupe, indehiscent. *Seed* solitary, pendulous; *albumen* none, or in very small quantity; *embryo* straight or curved, with foliaceous cotyledons; *radicle* superior.

1. *ULMUS*. *Flowers* perfect. *Calyx* campanulate, shriveled, persistent, four to nine-cleft, segments colored on the inner side. *Stamens* four to nine; *filaments* twice as long as the segments of the calyx, slender, inserted into the tube opposite each segment; *anthers* erect, short, with four furrows, and two cells, bursting lengthwise externally. *Ovary* flat, two-celled, with a single anatropous ovule suspended from the summit of each cell; *styles* two, short; *stigmas* two, terminal, spreading, downy, shorter than the calyx, finally inflexed. *Fruit* (by obliteration) a one-celled, one-seeded membranaceous samara, compressed, and winged all around. *Seeds* roundish, slightly compressed.—Trees, rarely

shrubs, with flowers, sometimes polygamous, purplish or yellowish, in lateral clusters, preceding the leaves, which are strongly straight-veined, short-petioled, and oblique, or unequally cordate at the base.

ORDER LXXXVII. EUPHORBIACEÆ. SPURGE.

Trees, shrubs, or herbs, often abounding in an acrid milky juice. *Leaves* opposite or alternate, simple, rarely compound, usually with stipules. Flowers monœcious, or diceious axillary or terminal, usually with bracts, and sometimes inclosed within an involucre. *Calyx* lobed, inferior, with various glandular, or scaly internal appendages; sometimes wanting. *Corolla* either consisting of petals or scales equal in number to, or more than the sepals, or monopetalous, or wanting. Males; *stamens* definite or indefinite, distinct or monadelphous; *anthers* two-celled, sometimes opening by pores. Females; *ovary* free, of two to nine more or less united carpels, usually stalked; *ovules* solitary or twin, suspended from the inner angle of the cell; *styles* as many as carpels, distinct, cohering or wanting, often two-cleft; *stigma* compound, or single with many lobes. *Fruit* usually tricoccous, of three carpels, usually opening elastically by one or both sutures, sometimes fleshy and indehiscent. *Seeds* solitary or twin, suspended, with an aril; *embryo* large, inclosed in fleshy albumen; *cotyledons* flat; *radicle* superior.

1. EUPHORBIA. *Flowers* in monœcious clusters, surrounded by a cup-shaped involucre, consisting of one leaf with four or five divisions, resembling a calyx or corolla, usually bearing large and thick glands externally at its sinuses. *Sterile* flowers, naked, twelve or more, and lining the base of the involucre, each from the axil of a little bract, and consisting merely of a single stamen jointed on a pedicel like the filament; *anther-cells* globular, separate. *Fertile* flower solitary, naked, in the middle of the involucre, soon protruded on a long pedicel, consisting of a three-lobed, three-celled ovary, with no calyx or a mere vestige. *Styles* three, but two-cleft; *stigmas* six. *Fruit* hanging out of the involucre, three-lobed, three-celled, bursting at the back with elasticity, and each cell containing one suspended seed, which is often caruncled.—Herbs with a milky juice, shrubs or trees abroad; the uppermost leaves often in whorls or pairs. Peduncles lateral or terminal; often umbellate-clustered.

2. RICINUS. *Flowers* monœcious. *Calyx* three to five-parted, valvate. *Sterile*; *stamens* numerous, unequally polyadelphous; *anther-cells* distinct, below the apex of the filament. *Fertile*; *style* short; *stigmas* three, deeply bipartite, oblong, feathery, colored. *Ovary* globose, three-celled, with an ovule in each cell. *Fruit* mostly aculeate, capsular, tricoccous.—Trees, shrubs, or herbs, with alternate, stipulate,

palmate, peltate leaves, with glands at the apex of the petiole. Flowers in terminal panicles, the lower male, the upper female; all articulate with their peduncles, and sometimes augmented by biglandular bracts.

3. CROTON. *Flowers* monœcious, rarely diœcious. *Calyx* cylindrical, five-parted. *Corolla* of five petals or none. Sterile; *petals* five. *Stamens* ten or more, distinct. Fertile; *petals* wanting. *Styles* three or six, divided into two or more divisions. *Capsule* tricoccous.—Tropical plants with stipulate, alternate, rarely opposite leaves, with a stellate pubescence.

4. BUXUS. *Flowers* monœcious, clustered or racemose. *Sepals* four, bracteate. Sterile; *stamens* four, with the rudiment of an ovary. *Petals* two or wanting. Fertile; *sepals* four; *petals* three; *styles* and *stigmas* three. *Capsule* with three beaks, three-cells; *cells* two-seeded each.—Evergreen shrubs or trees, with opposite leaves.

5. JATROPHA. *Flowers* monœcious. *Calyx* five-parted or lobed. *Corolla* five-parted or none. Sterile; *stamens* eight or ten, with unequal monadelphous filaments. Fertile; *styles* two, bifid or dichotomous. *Capsule* tricoccous.—Exotic.

6. JANIPHA. *Flowers* monœcious. *Calyx* campanulate, five-parted. *Petals* none. Sterile; *stamens* ten; *filaments* unequal, distinct, arranged around a disk. Fertile; *style* one; *stigmas* three, consolidated into a rugose mass. *Capsule* tricoccous.—Exotic.

7. HEVEA. *Flowers* monœcious. *Calyx* five-cleft or parted. *Petals* none. Sterile; *stamens* five to ten, columnar, with the anthers below the apex. Fertile; *stigmas* three, two-lobed. *Fruit* somewhat fleshy, tricoccous.—Exotic.

ORDER LXXXVIII. JUGLANDACEÆ. WALNUT.

Trees with alternate and unequally pinnate leaves, without pellucid dots or stipules. *Flowers* green, inconspicuous, usually monœcious; *sterile* in aments; *fertile* in small clusters. Sterile flowers; *calyx* with membranous, oblique, and irregular bracts. *Stamens* indefinite, (three to thirty-six) hypogynous; *filaments* very short, distinct; *anthers* thick, two-celled, innate, bursting longitudinally. Fertile flowers; *calyx* superior, limb three to five-parted, which are sometimes permanent and leafy. *Corolla* occasionally present, and three to five-parted, petals arising from between the calyx and the styles, and cohering at the base. *Ovary* inferior, one-celled, partially two to four-celled; *ovule* erect, solitary; *styles* one or two, and very short, or none; *stigmas* much

dilated, either two and lacerated, or discoid and four-lobed. *Fruit* drupaceous, one-celled, with four imperfect partitions; *endocarp* bony. *Seed* two to four-lobed, oily, exalbuminous; *embryo* shaped like the seed; *cotyledons* fleshy, two-lobed, wrinkled; *radicle* short, superior.

1. *JUGLANS*. *Flowers* monœcious. *Sterile* in long and simple lateral catkins, imbricated. *Calyx* adherent to the entire bracts or scales, unequally three to six-cleft. *Stamens* eighteen to thirty-six; *filaments* very short; *anthers* with a broad connective, opening longitudinally. *Fertile flowers* solitary, or several together on a peduncle at the end of the branches, with a four-toothed *calyx*, bearing four small *petals* at the sinuses. *Styles* two, very short; *stigmas* two, somewhat club-shaped and fringed. *Fruit* a drupe, inferior, with a fibrous-fleshy indehiscent epicarp, and a rough irregularly-furrowed endocarp or nut-shell. *Seed* erect, with deeply corrugated cotyledons.—Trees with strong-scented or resinous-aromatic bark, naked buds, and odd-pinnate leaves of many serrate leaflets. Pith in plates.

ORDER LXXXIX. CUPULIFERÆ, OR CORYLACEÆ. OAK OR MAST.

Trees and shrubs, with alternate, stipulate, simple *leaves*, often with the veins proceeding straight from the midrib to the margin. *Flowers* generally monœcious. *Sterile flowers* in aments, with a scale-like, or regular and membranaceous *calyx*, and from one to three times as many *stamens* as sepals, inserted into their bases, generally distinct. *Fertile flowers* solitary, or two or three together, or in fascicles. *Ovaries* crowned by the rudiments of the adherent calyx, seated within a coriaceous involucre (*cupule*), two to seven-celled, with one or two pendulous anatropous ovules in each cell; all the cells and ovules, except one, disappearing in the fruit, by abortion. *Stigmas* several, subsessile, distinct. *Fruit* a bony or coriaceous one-celled nut, more or less inclosed in the involucre. *Seeds* solitary, or one, two, or three, pendulous, exalbuminous; *embryo* large; *cotyledons* fleshy, plano-convex; *radicle* minute, superior.

1. *QUERCUS*. *Flowers* monœcious. *Sterile flowers* in aments, lax, deciduous. *Bracts*, four, five, or more cleft. *Stamens* five to ten; *filaments* short, awl-shaped; *anthers* two-celled. *Fertile flowers*; *involucre* hemispherical, imbricated, coriaceous, one-flowered, entire, much enlarged in the fruit, and externally scaly or tuberculated. *Calyx* in six minute, deep, sharp, downy segments, closely surrounding the base of the style. *Ovary* globose, three-celled, with two ovules in each, two of the cells abortive; *style* solitary, short, and conical; *stigmas* three, obtuse, recurved. *Nut* (acorn) solitary, oval, coriaceous, indehiscent, one-celled, one-seeded, surrounded at the base by the enlarged, cup-

shaped, scaly cupule. — Trees, rarely shrubs, with evergreen or deciduous leaves, entire or sinuately lobed; aments axillary, pendulous, filiform; flowers distinct.

2. *CARPINUS*. *Sterile flowers* in drooping cylindrical aments, consisting of about twelve *stamens* in the axil of a simple and entire scale-like *bract*, destitute of a proper calyx; *filaments* very short; *anthers* one-celled, slightly bearded at the apex. *Fertile flowers* several, spiked in a sort of loose terminal ament, with small deciduous bracts, each subtending a pair of flowers, consisting of a two-celled, two-ovuled *ovary* terminated by two thread-like stigmas. *Nut* small, ovoid, ribbed, stalked, each with a simple, one-sided, enlarged, open and leaf-like involucre. — Trees with a smooth gray bark, and slender buds; leaves appearing later than the flowers. Not bitter.

3. *OSTRYA*. *Sterile flowers* nearly as in *Carpinus*; *filaments* irregularly somewhat united; *anthers* conspicuously bearded at the summit. *Fertile flowers* numerous, in a short terminal ament, with small deciduous bracts; each inclosed in a membranous sac-like involucre which enlarges and forms a bladdery closed bag in fruit, these imbricated to form a sort of strobile, appearing like that of the Hop. *Ovary* two-celled, two-ovuled, crowned with the entire and bearded border of the calyx, forming a small and seed-like smooth nut. — Slender trees with brownish finely-furrowed bark; leaves appearing with the flowers. Bitter.

ORDER XC. PIPERACEÆ. PEPPER.

Shrubs or herbs with articulated *stems*, and opposite, verticillate *leaves* or alternate in consequence of the abortion of one pair; *stipules* none, or in pairs, or single and opposite the leaf. *Flowers* naked, perfect, with a bract on the outside; usually sessile, sometimes pedicellate, in spikes which are either terminal or axillary, or opposite the leaves. *Stamens* two or more, arranged on one side of, or all round the ovary, to which they adhere more or less; *anthers* one or two-celled, with or without a fleshy connective; *pollen* smooth, roundish. *Ovary* superior, simple, one-celled, with a solitary, erect, orthotropical *ovule*; *stigma* sessile, simple, rather oblique. *Fruit* superior, somewhat fleshy, indehiscent, one-celled, one-seeded. *Seed* erect, with the embryo lying in a fleshy sac placed at the end of the seed which is opposite the hilum, on the outside of the albumen.

1. *PIPER*. *Spike* wholly covered with flowers. *Flowers* perfect, rarely dicecious, each supported by a bracteole. *Stamens* varying from one to ten. *Ovary* with a single, erect ovule. *Stigma* punctiform, obtuse, or cleft. *Berry* one-seeded; *embryo* inverted.

ORDER XCI. BETULACEÆ OR AMENTACEÆ. BIRCH.

Trees or shrubs with alternate, simple *leaves*, the veinlets often running straight from the midrib to the margin; *stipules* deciduous. *Flowers* monœcious, amentaceous, mostly achlamydeous, ternate in the middle of a three-lobed bract. *Perianth* wanting, or of several small scales, sometimes resembling a real calyx. Sterile flowers; *stamens* distinct, scarcely ever monadelphous; *anthers* two-celled. Fertile flowers; *ovary* superior, two-celled; *ovules* two, pendulous; *style* one, or none; *stigmas* two. *Fruit* membranous, indehiscent, by abortion one-celled and one-seeded. *Seeds* pendulous, naked, exalbuminous; *embryo* straight; *radicle* superior; *cotyledons* flattish, oblong.

1. BETULA. Sterile flowers; *aments* cylindrical, lax, imbricated all round, with ternate, concave scales; the middle one largest, ovate. *Stamens* ten or twelve; *filaments* shorter than the middle scale to which they are attached; *anthers* one-celled. Fertile flowers; *aments* similar, but more dense; *scales* horizontal, peltate, dilated outward, three-lobed, three-flowered. *Ovary* compressed, bordered, of two cells; *styles* two, awl-shaped, downy; *stigma* simple. *Nut* oblong, compressed, deciduous, winged on each side, of one cell, with a solitary seed.—Trees and shrubs, mostly with the outer bark laminated and horizontally fibrous, that of the branchlets dotted. Leaves ovate, serrate and alternate.

2. ALNUS. Sterile catkins elongated and drooping, with five bractlets, and one to three flowers under each scale, each flower usually with a four-parted tubular *calyx* and four *stamens*; *filaments* four, opposite the lobes of the calyx; *anthers* two-celled. Fertile catkins ovoid or oblong, composed of two-flowered, simple scales, with a *calyx* of four little scales coherent with the scales or bracts of the catkin, which are thick and woody in fruit, all coherent below, and persistent. *Ovary* two-celled, with two, parallel, tapering, deciduous styles. *Nut* ovate, bony, angular, not winged, two-celled, two-seeded.—Shrubs or small trees arising from large and strong roots; buds pedunculate; leaves plicate in veneration, alternate, simple, deciduous.

ORDER XCII. MYRICACEÆ. SWEET-GALE.

Shrubs covered with resinous glands or dots, the *leaves* alternate, simple, with or without stipules. *Flowers* monœcious or dicecious, amentaceous, each axillary to a bract. Males; *stamens* two to six, rarely eight, somewhat monadelphous; *anthers* two or four-celled, opening lengthwise. Females; *ovary* one-celled, surrounded by several hypogynous scales; *ovule* solitary, erect, with a foramen in its apex; *stigmas* two, subulate, or dilated and petaloid. *Fruit* drupaceous, often covered

with waxy secretions, and, with the hypogynous scales of the ovary, become fleshy and adherent; or dry and dehiscent, with the scales distinct. *Seed* solitary, erect, exalbuminous; *cotyledons* two, plano-convex; *radicle* short, superior.

1. MYRICA. *Flowers* diœcious. *Sterile aments* oblong or cylindrical, consisting of bracts loosely imbricated in every direction. *Calyx* one or two subulate scales. *Bracts* ovate, bluntish, concave, each containing four, rarely more, short, capillary, erect *filaments*, somewhat united below; *anthers* vertical, large, two-lobed, four-valved. *Fertile aments* in ovoid catkins, closely imbricated. *Sepals* two, ovate, acute, scale-like. *Ovary* ovate, flattish, superior; *stigmas* two, filiform, spreading, longer than the sepals. *Fruit* baccate, one-celled, various in substance, studded with resinous grains or wax. *Seed* one, erect.—Aromatic shrubs and small trees, with stipules very fugacious, or none.

2. COMPTONIA. *Flowers* monœcious. *Sterile flowers* in cylindrical, loosely-imbricated aments, with deciduous, one-flowered, cordate-reniform, pointed scale-like bracts; *sepals* two. *Stamens* six, adhering in pairs. *Fertile flowers* in globular, burr-like, densely-imbricated aments, with one-flowered bracts. *Ovary* surrounded by five or six linear, awl-shaped scales or sepals, longer than the bracts; *styles* two, capillary. *Nut* ovoid-oblong, smooth, one-celled.—Low shrubs, with long and narrow leaves, pinnatifid-lobed, with small stipules.

ORDER XCIII. SALICACEÆ. WILLOW.

Trees or shrubs with alternate, simple leaves, with deliquescent primary veins, and frequently with glands, and deciduous or persistent stipules. *Flowers* diœcious, amentaceous, achlamydeous, axillary to one-flowered bracts. *Sterile*; *stamens* two to several, distinct or monadelphous; *anthers* two-celled. *Fertile*; *ovary* superior, one or two-celled; *ovules* numerous, erect, at the base of the cell, or adhering to the lower part of the sides; *styles* or *stigmas* two. *Fruit* coriaceous, one or two-celled, two-valved, or to the base of the cell, comose; *seeds* numerous, ascending, covered with long, silky hairs, exalbuminous; *embryo* erect; *radicle* inferior; *cotyledons* flattened.

1. SALIX. *Flowers* diœcious; rarely monœcious, amentaceous, each with a single flexible bract; a nectariferous gland around the stamens or ovary. *Male*; *stamens* two to six, rarely single; *filaments* longer than the bract; in some partly combined; *anthers* two-lobed, with a longitudinal dehiscence. *Female*; *ovary* ovate, one-celled, many-seeded; *style* terminal, permanent; *stigmas* two, notched and obtuse, or cloven and acute, spreading. *Capsule* ovate, one-celled, with two revolute, concave valves. *Seeds* numerous, minute, oval, tufted with soft, simple, upright

hairs.—Leaves usually narrow and elongated, each with two conspicuous stipules; aments terminal or lateral, appearing before or with the leaves.

2. *POPULUS*. Male; *ament* oblong, cylindrical, loosely imbricated, many-flowered. *Bract* single-flowered, wedge-shaped, flat, lacerately fringed at the summit. *Calyx* turbinate and tubular below; dilated, undivided, and obliquely cup-shaped in the border. *Stamens* eight or more; *filaments* very short, capillary, distinct; *anthers* drooping, large, quadrangular. Female; *catkin* as in the male but generally shorter; *bract* and *calyx* as in the male. *Ovary* ovate, pointed; *stigmas* four or eight, subulate. *Capsule* ovate, one-celled, with two concave valves. *Seeds* numerous, small, ovate, each crowned with a tuft of fine hairs.—Leaves broad ovate, or cordate; petioles long, often compressed vertically, and glandular. Aments lateral, preceding the leaves.

ORDER XCIV. ALTINGIACEÆ OR BALSAMACEÆ. LIQUIDAMBAR.

Trees yielding balsam, with alternate, simple or lobed leaves, having glandular serratures, and deciduous stipules. Aments monœcious, roundish, with achlamydeous flowers; female aments on longer peduncles than the males, and below them. Male; *anthers* numerous, oblong, subsessile, destitute of calyx, but intermixed with a few minute scales and covering the common receptacle. Female; *ovaries* two-celled, collected into a globe, each surrounded by a few scales; *styles* two, long; *ovules* indefinite, attached to the dissepiment, amphitropal. *Fruit* a kind of strobile, composed of indurated, connected scales, in the cavities of which lie obconical, two-lobed, two-celled capsules. *Seeds* numerous, or solitary by abortion, compressed, membranous, winged, attached internally to the middle of the dissepiments in a peltate manner. *Embryo* inverted in the midst of fleshy albumen; *radicle* short, superior.

1. *LIQUIDAMBAR*. Aments of distinct sexes, monœcious, having a common four-leaved deciduous involucre. *Sterile catkins* conical or globose, composed of extremely numerous subsessile anthers. *Fertile catkins* globose, composed of small scales, which surround the ovaries, grow together, and gradually enlarge. *Styles* two, subulate. *Capsules* oblong, two-lobed, immersed in sockets formed by the scales, two-celled, opening at the apex between the styles, many-seeded. *Seeds*, same as above.—Tall trees.

ORDER XCV. URTICACEÆ. NETTLE.

Trees and shrubs with a milky juice, or herbs with a watery juice. *Leaves* alternate or opposite, rough or covered with stinging hairs, with membranous stipules, which are deciduous or convolute in veneration.

Flowers monœcious, diœcious, or polygamous, scattered or clustered, or in catkins, or close heads. *Calyx* membranous, lobed, persistent. *Stamens* definite, distinct, inserted into the base of the calyx, and opposite its lobes; *anthers* curved inward in æstivation, turned backward elastically when bursting at maturity. *Ovary* superior, simple; *ovule* solitary, erect, or suspended; *stigma* simple, fringed. *Fruit* a simple indehiscent nut, surrounded by the membranous or fleshy calyx; or a fleshy receptacle, either covered by numerous nuts, lying along the persistent fleshy calyxes, or inclosing them within its cavity; occasionally consisting of a single nut, covered by a succulent involucre. *Embryo* straight, curved or spiral, with or without albumen; *cotyledons* flat; *radicle* always pointing to the hilum.

SUB-ORDER I. MOREÆ. MULBERRY.

Shrubs or trees with a milky juice. Fruit fleshy, composed of the fleshy calyx or receptacle.

1. *MORUS*. *Flowers* monœcious or diœcious; the two kinds in separate axillary catkin-like spikes. *Calyx* four-parted, spreading, membranous, the sepals ovate. Male; *stamens* four, longer than the calyx, with the rudiment of an ovary between their bases; *filaments* expanding elastically. Female; *sepals* four, scale-like, imbricating each other; two being opposite and external to the other two. *Stigmas* two, linear, glandular; *ovule* solitary, suspended. *Fruit* consisting of the female flowers becoming fleshy and grown together, each inclosing a dry, membranous pericarp. *Seed* pendulous; *embryo* curved like a horse-shoe, among fleshy albumen, with the *radicle* directed to the hilum.—Trees with alternate, generally lobed leaves, with large, deciduous stipules; flowers inconspicuous.

2. *FICUS*. *Flowers* monœcious, placed all over the inside of a large fleshy hollow receptacle, which is closed up with a few scales. *Male flowers* irregular, of several unequal membranous segments. *Stamens* one to five. *Fertile flowers*; *calyx* five-parted, membranous, converging over a simple *carpel*, containing one suspended ovule, and terminated by a subulate *style* and bifid *stigma*. *Achenium* lenticular, hard, dry. *Embryo* curved, in the middle of fleshy albumen.

3. *DORSTENIA*. Monœcious; *flowers* on a fleshy receptacle, usually flat and expanded, and extremely variable in form. *Sterile*; on the surface of the receptacle, two-lobed, fleshy, diandrous. *Fertile*; immersed in the receptacle, mostly two-lobed. *Ovary* one or two-celled, with a single, suspended ovule in each cell; *style* one; *stigma* two-lobed. *Achenia* lenticular, imbedded in the fleshy receptacle; from which they

are projected elastically, when ripe.—Dwarf herbaceous plants with scaly rhizomata.

SUB-ORDER II. URTICÆÆ. NETTLE.

Herbs, in cool climates, with a watery juice. Flowers spicate or paniculate, with a membranaceous calyx.

4. URTICA. Flowers monœcious or diœcious. Sterile; *calyx* of four roundish, concave, obtuse, equal sepals. *Stamens* four, awl-shaped, spreading, opposite the sepals, and about as long; surrounding the rudiment of an ovary. Fertile; *calyx* of two, equal, roundish, concave sepals. *Ovary* superior, ovate; *stigma* sessile, downy. *Achenia* ovate or oblong, flattish, polished, embraced by the permanent calyx.—Herbs often with stinging hairs; leaves accompanied with stipules; flowers green, in axillary or subterminal clusters; bark yielding strong fibers like hemp.

SUB-ORDER III. CANNABINÆÆ. HEMP.

Herbs erect or twining, with a watery juice. Staminate flowers racemose or paniculate; pistillate in a cone-like ament. Albumen none.

5. CANNABIS. Flowers diœcious. *Male flowers* racemose. *Calyx* five-parted, imbricated. *Stamens* five; *anthers* large, pendulous. *Female flowers* in spikes. *Bract* or *calyx* entire, oblong-acuminate, rolled round the ovary. *Ovary* roundish, with one pendulous *ovule*, and two long filiform glandular *stigmas*. *Achenia* ovate, one-seeded; *embryo* doubled up, with the *radicle* parallel with the plano-convex *cotyledons*, and separated from them by a small quantity of albumen.—A tall roughish annual, with digitate leaves of five to seven linear-lanceolate coarsely-toothed leaflets, the upper alternate; the inner bark of very tough fibers.

6. HUMULUS. Flowers diœcious; *males* with five oblong, concave, obtuse sepals; *stamens* five; *filaments* capillary, very short; *anthers* vertical, oblong, of two cells, opening by two lateral slits. *Female flowers* in short axillary and solitary catkins, composed of numerous, membranous, imbricated, foliaceous, concave bracts, one to each floret. *Calyx* none, except a bractlet which embraces the ovary and grows with it after flowering. *Stigmas* two, subulatè, spreading, downy. *Achenium* attached to the base of each enlarged, membranous, dry scale of the catkin, roundish; *pericarp* hard, brittle, covered by roundish aromatic superficial glands, or lupulin.—A rough perennial herb, twining with the sun; leaves opposite, cordate, three to five-lobed, with persistent, ovate stipules between the petioles; flowers in axillary panicles, and strobile-like aments.

CLASS II. GYMNOSPERMS.

Ovules not inclosed in an ovary, fertilized by the pollen without the intervention of a pistil, and becoming truly *naked seeds*, the carpel being represented by a flat open scale, or entirely wanting. *Embryo* with two opposite, or several whorled cotyledons.

ORDER XCVI. CONIFERÆ OR PINACEÆ. FIR.

Trees or evergreen shrubs with branching trunks, abounding in a resinous juice. *Leaves* scattered or fascicled, linear, acerose, or lanceolate, parallel-veined, rigid. *Flowers* monœcious or diœcious, destitute of calyx or corolla. *Sterile flowers* monandrous or monadelphous; each floret consisting of a single *stamen*, or of a few united, and collected in a deciduous ament around a common rachis; *anthers* two, or many-lobed, with a longitudinal dehiscence, often tipped by a crest, which is an unconverted portion of the scale out of which each stamen is formed; *pollen* large, usually compound. *Female flowers* in cones. *Ovary* spread open, and having the appearance of a flat scale destitute of style or stigmas, and arising from the axil of a membranous bract. *Ovule* naked; in pairs on the face of the ovary, having an inverted position, and consisting of one or two membranes open at the apex, and of a nucleus. *Fruit* consisting of a strobile or cone formed of the scale-shaped ovaries, becomes enlarged and indurated, and occasionally of the bracts also, which are sometimes obliterated, and sometimes extend beyond the scales in the form of a lobed appendage. *Seed* with a hard crustaceous integument; *embryo* in the midst of fleshy, oily albumen, with two or many opposite *cotyledons*; the *radicle* next the apex of the seed, and having an organic connection with the albumen.

SUB-ORDER I. ABIETINÆ. PINE.

Sterile aments numerous, deciduous. Scales peltate, each bearing two sessile, one-celled anthers; pollen oval-curved. Fertile aments formed of carpellary scales closely imbricated, each bearing a pair of ovules adhering to the base inside, and subtended by a bract outside. Strobile ovoid; seeds winged; integument of seed coriaceous and woody; more or less adherent to the scale. Embryo in the axis of fleshy and oily albumen, with two to fifteen cotyledons.

1. PINUS. *Flowers* monœcious. *Sterile catkins* racemose, consisting of numerous *stamens* inserted on the axis, with very short *filaments*, and a scale-like connective; *anthers* two-celled, opening longitudinally or irregularly in a transverse direction. *Pollen* of three united grains. *Fertile catkins* terminal, solitary, or clustered, consisting of imbricated, carpellary scales, each in the axil of a deciduous bract, bearing a pair

of collateral inverted *ovules* at the base, their points lacerated and directed downward. *Fruit* a cone consisting of hard, woody, truncated scales, imbricated, and usually thickened at the apex, persistent, spreading when ripe and dry; excavated at the base for the reception of the seeds. *Seeds* extended at the base into a membranous wing. *Cotyledons* three to twelve, linear.—Trees often very lofty, with evergreen, acerose leaves, in fascicles of two to five, each being invested with a membranous, tubular sheath at base.

2. *ABIES*. Characters the same as *Pinus*, except that the *leaves* are solitary and distinct at base, never sheathed; and the *scales* of the cones are attenuated to a thin, even edge, and usually coriaceous or membranous.—Leaves all scattered, short, frequently two-ranked.

3. *LARIX*. *Catkins* lateral and scattered, bud-like. *Sterile-flowers* nearly as in *Pinus*, but the pollen of simple, spherical grains. *Cones* ovoid, erect; the bracts and scales persistent; otherwise as in *Abies*.—Leaves soft, deciduous, very many in a fascicle developed in early spring from lateral, scaly, and globular buds, which produce (the same or the second year) growing shoots on which the leaves are scattered. Fertile catkins crimson or red in flower.

SUB-ORDER II. CUPRESSINEÆ. CYPRESS.

Carpellary scales not bracteate, each with one to eight erect *ovules* at base inside, becoming concreted and fleshy in a drupe-like fruit. Anthers of several cells.

4. *THUJA*. *Flowers* monœcious on different branches, in very small, terminal, ovoid catkins. *Stamens* with a scale-like *filament* or connective, bearing four anther-cells. *Fertile-catkins* of few, imbricated scales, fixed by the base, each bearing two erect *ovules*, dry and spreading at maturity. *Seed* winged; *integument* membranous; *cotyledons* two or more.—Small evergreen trees, with very flat, two-ranked spray, on which the minute and appressed, scale-like and persistent leaves are very closely imbricated.

5. *JUNIPERUS*. *Flowers* diœcious, occasionally monœcious, upon different branches. *Sterile catkins* axillary or subterminal, globose, very small; *anthers* three to six cells, attached to the lower edge of the shield-shaped scale. *Fertile catkins* axillary, ovate, imbricated, with bracts at the base. *Scales* three to six, united at the base, and containing one to three *ovules*, which are erect, perforated at the apex, and bottle-shaped. *Fruit* a sort of drupe or berry, consisting of the enlarged, fleshy scales; scaly-bracted underneath. *Seeds* one to three, bony.

Cotyledons two.—Evergreen trees or shrubs, with awl-shaped or scale-like, rigid leaves, opposite or in whorls of three.

SUBDIVISION II.

ENDOGENS OR MONOCOTYLEDONOUS PLANTS.

Stem not distinguishable into bark, pith, and concentric zones or layers of wood. *Growth* by irregular, internal accretions, consisting of bundles of woody fiber and vessels, successively descending from the leaves above, through the cellular tissue already formed. *Leaves* mostly with simple, parallel veins, alternate, entire, frequently sheathing at base, and seldom falling off by an articulation. *Sepals* and *petals* when present, commonly in threes. *Ovules* produced within an ovary. *Embryo* with one cotyledon, rarely with two, the second being much smaller than, and alternate with, the first.

CLASS III. AGLUMACEOUS ENDOGENS.

Flowers without glumes. Organs developed on the usual and normal plan, consisting of stamens and pistils, either or both, surrounded by verticillate, floral envelopes; or the latter are wanting, and the stamens and pistils are achlamydeous.

ORDER XCVII. ZINGIBERACEÆ OR SCITAMINEÆ. GINGER.

Aromatic, tropical, herbaceous plants, with a creeping *rhizoma*, often jointed. *Stem* formed of the cohering bases of the leaves, never branching. *Leaves* simple, sheathing, their *lamina* often separated from the sheath by a taper neck, and having a single midrib, from which very numerous, simple, crowded veins diverge at an acute angle. *Inflorescence* either a dense spike, or a raceme, or a sort of panicle, terminal or radical. *Flowers* arising from among spathaceous, membranous bracts, in which they usually lie in pairs. *Calyx* superior, tubular, three-lobed, short. *Corolla* tubular, irregular with six segments in two whorls; the *outer* three-parted, nearly equal, or with the odd segment, sometimes differently shaped; the *inner* (sterile stamens) three-parted, with the intermediate segment (*labellum*) larger than the rest, and often three-lobed, the lateral segments sometimes imperfectly abortive. *Stamens* three, distinct, of which the two lateral are abortive, and the intermediate one fertile; this is placed opposite the labellum, and arises from the base of the middle segment of the true, or outer series of the corolla. *Filament* often projecting beyond the anther in the shape of a lobed or not entire appendage, not petaloid. *Anther* two-celled opening longitudinally, its lobes often embracing the upper part of the style. *Pollen* globose, smooth. *Ovaries* three-celled, sometimes imperfectly so; *ovules* several, anatropal, attached to a placenta in the axis; *style* filiform; *stigma* dilated, hollow. *Fruit* generally capsular, three-celled,

many-seeded, sometimes berried; sometimes by abortion one-celled. *Seeds* roundish or angular, with or without an arillus; *albumen* mealy; *embryo* in a vitellus.

1. ZINGIBER. *Corolla* with the outer limb three-parted, inner one-lipped. *Filament* projecting beyond the anther in a simple, incurved beak. *Capsule* three-celled, three-valved. *Seeds* numerous, with arils.—Tropical plants.

2. CURCUMA. *Tube of the corolla* gradually enlarged upward; *limb* two-lipped, each three-parted. *Filament* broad; *anther* incumbent, with two spurs at base. *Style* capillary. *Capsule* three-celled. *Seeds* numerous, arillate.—Stemless plants, with palmated tuberous roots, and bifarious, sheathing leaves; scape simple, lateral or central, with dull yellow flowers.

3. AMOMUM. *Inner limb of the corolla* one-lipped. *Filament* dilated beyond the anther, with an entire or lobed crest. *Capsule* often berried, three-celled, three-valved. *Seeds* numerous, arillate.—Herbaceous perennials, tropical, with leaves in two rows, and having articulated, creeping rhizomes.

4. Elettaria. Characters similar to those of Amomum, except that the *tube of the corolla* is filiform, and the *anther* naked.

5. ALPINIA. *Corolla-tube* short; *inner limb* one-lipped, either toothless, or with a small tooth at base on each side. *Filament* linear, scarcely prolonged beyond the emarginate anther. *Capsule* berried, three-seeded. *Seeds* few or numerous arilled.—Plants with thick, tuberous, horizontal roots, producing many, perennial stems; leaves, bifarious lanceolate, having a slit, ligulate sheath. Inflorescence panicled, or in loose racemes or spikes, terminal. Tropicals.

ORDER XCVIII. ARACEÆ. ARUM.

Herbs or tropical shrubs, with a fleshy *rhizoma* or *cormus*; stemless or arborescent, or climbing by means of aerial roots. *Leaves* sheathing at base, convolute in the bud, either with parallel or branching veins; sometimes compound; often cordate. *Spadix* generally inclosed in a *spathe*. *Flowers* mostly monœcious and achlamydeous, arranged upon a naked or spathaceous spadix. *Perianth* wanting, or when present, consisting of four to six parts. Males; *stamens* definite or indefinite, hypogynous, very short; *anthers* one, two, or many-celled, ovate, extrorse. Females; *ovary* free, one-celled, seldom three-celled, and many-seeded; *ovules* erect, or pendulous, or parietal; *stigma* sessile. *Fruit* berry succulent or dry. *Seeds* solitary or several, pulpy; *embryo*

in the axis of fleshy or mealy *albumen*, straight, taper, with a cleft in one side, in which the plumule lies; *radicle* obtuse, usually next the hilum, occasionally at the opposite extremity. *Albumen* sometimes wanting.—An acrid, volatile principle pervades the order, which is, in some instances, so concentrated as to become poisonous; the corms and rhizomas abound also in starch, which in some cases, when the volatile acidity is expelled in drying or cooking is edible and nutritious.

1. *ARUM*. *Flowers* monœcious, the upper sterile and the lower fertile; or sometimes polygamo-dioecious, on the base of an elongated spadix which is naked above, interruptedly unisexual at the bottom, and surrounded by a spathe which is convolute below. *Floral envelopes* none. *Rudimentary organs* beneath, and occasionally above the stamens. *Anthers* crowded and somewhat whorled on the spadix, distinct or variously consolidated, almost sessile, with two to four lateral cells opening by a partial slit. *Ovaries* free, one-celled, with two to six orthotropous *ovules* attached to the inner-lining; *stigmas* sessile, obtuse. *Berries* distinct, one to several-seeded. *Embryo* in the axis of the albumen.—Low perennial herbs, with a tuberous rootstock or corm, sending up a simple scape sheathed with the petioles of the simple or compound veiny leaves, as if caulescent.

2. *ARISÆMA*. *Spathe* convolute at base. *Spadix* naked at the point, unisexual or dioecious below; *rudimentary organs* placed above the fertile flowers, or altogether absent. *Anthers* on distinct filaments, whorled, with the cells either disjointed or approximated, opening by a pore or transverse cleft. *Ovaries* distinct, one-celled; *ovules* two to six, seldom more, at the base, erect; *styles* absent or short; *stigmas* undivided. *Berry* one or few-seeded; *seeds* albuminous.

3. *ACORUS*. In *Acoraceæ* of some authors. *Spadix* naked, lateral, sessile, emerging from the side of a scape which resembles the leaves, densely covered with perfect flowers. *Sepals* or *scales* six, concave. *Stamens* six; *filaments* linear; *anthers* reniform, one-celled, opening across. *Ovary* two or three-celled, with about six suspended orthotropous *ovules* in each cell; *stigma* minute. *Fruit* at length dry, gelatinous inside, one or few-seeded. *Embryo* in the axis of the albumen.—Pungent aromatic plants, especially the thick, creeping, perennial rootstocks, which send up two-edged sword-like leaves, and scapes similar to them, bearing the spadix on one edge; the upper and more foliaceous prolongation sometimes considered as an open spathe. *Flowers* yellow.

4. *SYMPLOCARPUS*. *Spathe* hooded-shell form, pointed, fleshy, decaying in fruit. *Spadix* on a short peduncle, entirely covered with perfect flowers, which are thickly crowded; *Sepals* four, hooded. *Stamens*

four, opposite the sepals; *filaments* short; *anthers* extrorse, two-celled, opening lengthwise. *Ovaries* one-celled, or abortively two-celled, immersed in the fleshy receptacle. *Style* four-angled; *stigma* minute. *Ovule* solitary, orthotropous, suspended. *Fruit* a large globular or oval mass, composed of the enlarged and spongy spadix, inclosing the spherical seeds just beneath the surface, which is roughened with the persistent and fleshy sepals, and pyramidal styles. *Seed* filled by the large, globular, and fleshy corm-like embryo, which bears one or several plumules at the end next the base of the ovary, exalbuminous.—Perennial, aquatic, acaulescent herbs, with a strong unpleasant alliaceous odor, a thick descending rootstock bearing coarse fibrous roots, and a cluster of very large and entire, veiny leaves, preceded by the nearly sessile spathes.

ORDER XCIX. TYPHACEÆ. CAT-TAIL.

Herbs growing in marshes or ditches. *Stems* without joints; *leaves* rigid, ensiform, with parallel veins. *Flowers* monœcious, arranged upon a spadix without a spathe. *Sepals* three or more, sometimes a mere bundle of hairs. *Petals* wanting. Males; *stamens* three or six; *filaments* long and slender; *anthers* cuneiform, erect. Females; *ovary* single, superior, one-celled; *ovule*, solitary, pendulous; *style* short; *stigmas* one or two, linear. *Fruit* a dry, indehiscent utricle, one-celled, one-seeded. *Embryo* in the center of the *albumen*, straight, taper, with a cleft in one side in which the *plumule* lies; *radicle* next the hilum.

1. *TYPHA*. *Flowers* in a long and very dense cylindrical spike terminating the stem; the upper or sterile part consisting of *stamens* only, about three together, united into a common *filament*, intermixed with simple hairs, and inserted directly on the axis. The lower or fertile part consisting of pedicellate *ovaries*, surrounded at base by club-shaped bristles, which form the copious down of the fruit. *Nutlets* minute, very long-stalked. Rootstocks creeping, perennial. Spathes very deciduous bracts or none. Leaves sheathing the base of the simple, jointless stems, erect, thickish.

ORDER C. ALISMACEÆ. WATER-PLANTAIN.

Aquatic herbs, with parallel-veined *leaves*. *Flowers* racemose or paniculate; perfect or monœcious, regular, not on a spadix. *Perianth* of three, green, herbaceous sepals. *Corolla* of three, colored petals. *Stamens* definite or indefinite, hypogynous; *anthers* extrorse, two-celled. *Ovaries* superior, several, one-celled; *ovules* erect or ascending, solitary, or two attached to the suture at a distance from each other. *Styles* and *stigmas* of the same number as the ovaries. *Fruit* dry, indehiscent, one or two-seeded. *Seeds* straight or curved, exalbuminous; *embryo* undivided, horseshoe-shape, with the same directions as the seeds.

1. *ALISMA*. *Flowers* perfect. *Petals* involute in the bud. *Stamens* six. *Ovaries* and *styles* many, in a simple circle on a flattened receptacle, forming flattened coriaceous *achenia* in fruit. — *Caulescent* perennials with fibrous roots; leaves radical, several-ribbed, with connected veinlets; scape with whorled paniced branches. *Flowers* small, white, or pale rose-color.

ORDER CI. MARANTACEÆ. ARROW-ROOT.

Tropical herbs with creeping *rhizoma* abounding in nutritive fecula; *stem* often branching; *leaves*, *inflorescence*, and *flowers*, same as in Zingiberaceæ. *Calyx* superior, three-sepalled, short. *Corolla* tubular, irregular, with the segments in two whorls; the *outer* three-parted, nearly equal; the *inner* very irregular; one of the lateral segments usually colored, and formed differently from the rest; sometimes by abortion fewer than three. *Stamens* three, petaloid, distinct, only one lateral, one fertile; *filament* petaloid, entire or two-lobed, one of the lobes bearing the anther on its edge; *anther* one-celled, opening longitudinally. *Pollen* round. *Ovary* one to three-celled; *ovules* solitary, erect and campylotropal, or numerous and anatropal; *style* petaloid or swollen; *stigma* either the mere naked end of the style, or hollow, cucullate, and incurved. *Fruit* capsular. *Seeds* round, without aril; *albumen* hard, somewhat floury; *embryo* naked, straight, its radicle lying against the hilum.

1. *MARANTA*. *Corolla* unequal, one of the inner segments in the form of a lip. *Stamens* petaloid, one fertile, with an anther on its edge. *Style* hooded, adhering to the edge of a sterile filament. *Ovary* three-celled, smooth; *ovules* solitary. *Fruit* even, dry, one-seeded. — *Caulescent* plants with fleshy *rhizomata* or tubers; stems branched, often dichotomous; *inflorescence* terminal, paniced, jointed, with glumaceous deciduous bracts.

2. *CANNA*. *Corolla* unequal, variable in the number of its parts, scarcely lip-shaped in any segment. *Stamens* petaloid, one with half an anther on its edge. *Style* flat, straight, nearly free. *Ovary* three-celled, with many ovules, granular. *Fruit* membranous, three-valved, with a deciduous granular surface. *Seeds* round, smooth. — *Rhizomas* creeping, tuberous, or wanting; stems erect, with distant sheathing leaves; *inflorescence* terminal spiked or racemose; flowers invested with glumaceous bracts.

ORDER CII. ORCHIDACEÆ. ORCHIS.

Perennial herbs, often acaulescent, with fleshy corms, or tuberous fasciculated roots. *Leaves* simple, parallel-veined, entire, often articulated with the stem. *Flowers* in terminal or radical racemes, spikes or

panicles rarely solitary; very irregular, with an adherent, ringent perianth of six parts. *Calyx* of three sepals, usually colored, the odd one usually uppermost in consequence of the twisting of the ovary. *Corolla* of three petals, or two, and sometimes absent; usually colored, of which two are uppermost in consequence of the twisting of the ovary, and one, called the lip, undermost; this latter is frequently lobed, of a different form from the others, and very often spurred at the base. *Stamens* three, united in a central column, the two lateral abortive, the central perfect, or the central abortive, and the two lateral perfect; *anther* persistent or deciduous, two, four, or eight-celled. *Pollen* powdery, or else cohering in waxy or mealy masses which are free, or connected to the anther by a caudicle. *Ovary* adherent, one-celled, of six carpels; *style* forming part of the column of the stamens, rarely distinct; *stigmas* usually confluent in a mucous disk; *impregnation* being effected by absorption from the pollen masses through the gland into the stigmatic canal. *Capsule* inferior, rarely fleshy, indehiscent, pod-shaped, separating into six dry, rigid valves, with horizontal cells three of which only contain seeds. *Seeds* parietal, very numerous, minute; *testa* loose, reticulated, contracted at each end; *albumen* none; *embryo* a solid, undivided, fleshy mass.

1. GOODYERA. *Perianth* ringent. Lateral sepals not oblique at the base; upper sepal vaulted, the two lower ones beneath the lip. *Lip* saccate at base, sessile, without callosities, contracted at the apex into a pointed and channeled recurved termination. *Column* free, small, straight. *Pollen-masses* two, consisting of angular grains loosely cohering by a manifest web. *Stigma* prominent, roundish.—Root of thick fibers from a fleshy, somewhat creeping rootstock, bearing a tuft of thickish petioled leaves next the ground. Scape and spike with the greenish-white small flowers, usually glandular-downy.

2. CYPRIPIEDUM. *Sepals* spreading; the two anterior distinct, or commonly united into one under the lip. *Petals* similar, but usually narrower, spreading. *Lip* a large, inflated sac, somewhat slipper-shaped. *Column* short, three-lobed, the lateral lobes bearing a two-celled anther under each of them; the middle lobe (sterile stamen) dilated and petaloid, thickish, incurved. *Pollen* pulpy-granular. *Stigma* terminal.—Root of many tufted fibers; leaves large, many-nerved and plaited, sheathing at the base. Flowers solitary or few, large and showy.

ORDER CIII. VANILLACEÆ. VANILLA.

Herbs with broad *leaves*, sessile, and often strongly veined; *stem* mostly climbing; *flowers* large and succulent. *Perianth* articulated with the ovary, sometimes with an external calycine cup. *Sepals* three. *Petals* three, of which one is unlike the others, and forms a lip. *Stamen*

one, consolidated with the style into a column; *anther* terminal, opercular; *pollen* granular. *Ovary* one-celled, with three parietal placentæ. *Fruit* succulent, indehiscent, one-celled. *Seeds* either with a smooth testa tightly adhering to them, or with a thin membranous wing surrounding a firm nucleus.

1. VANILLA. *Sepals* spreading or erect, distinct. *Petals* of a similar form and texture. *Labellum* connate with the columna, crested, membranous, convolute, undivided. *Anther* terminal, opercular. *Pollen* granular. *Fruit* a fleshy cylindrical silique. *Seeds* round, destitute of a loose tunic.—Climbing plants with a slender stem, emitting numerous simple roots.

ORDER CIV. AMARYLLIDACEÆ. NARCISSUS.

Perennial herbs, with bulbous *roots*, sometimes fibrous, and occasionally with a tall, cylindrical, woody *stem*. *Leaves* ensiform, with parallel veins. *Flowers* usually with spathaceous bracts, and often on scapes, almost always either yellow or white. *Perianth* mostly regular, adherent to the ovary, colored, consisting of three sepals, and three petals. *Stamens* six, arising from the perianth segments, sometimes cohering by their dilated bases into a kind of cup; sometimes an additional series of barren stamens is present, often forming a cup which surmounts the tube of the perianth; *anthers* bursting inwardly. *Ovary* three-celled, the cells one or many-ovuled; *style* one; *stigma* three-lobed. *Fruit* a three-celled, three-valved capsule, with loculicidal dehiscence, or a berry, one to three-seeded. *Seeds* with either a thin and membranous, or a brittle and black, or a thick and fleshy testa; *albumen* fleshy or corneous; *embryo* nearly straight, with its radicle turned toward the hilum.

1. AGAVE. *Perianth* tubular-funnel-form, persistent, six-parted; the divisions nearly equal, narrow. *Stamens* six, soon exserted; *anthers* linear, versatile. *Capsule* ovate, coriaceous, alternate at each end, obtusely triangular, three-celled, many-seeded. *Seeds* flattened.—Root sometimes ligneous; stem herbaceous; leaves mostly radical, rigid, channeled, fleshy, often spiny; panicle large, pyramidal.

ORDER CV. LILIACEÆ. LILY.

Herbs with fibrous or fasciculate *roots*; *stem* none, except a bulb; or tuberous, or creeping, or erect, or arborescent. *Leaves* with parallel veins, membranous, not articulated with the stem; either sessile, or with a narrow leafy petiole. *Flowers* hermaphrodite. *Calyx* and *corolla* colored alike, regular or nearly so, sometimes cohering in a tube. *Stamens* six, inserted into the sepals and petals; *anthers* introrse. *Ovary* superior, three-celled, many-seeded; *style* one; *stigma* simple, or three-

lobed ; *ovules* anatropal or amphitropal. *Fruit* succulent, or dry and capsular ; three-celled. *Seeds* imbricated in one or two rows ; *embryo* with the same direction as the seed, in the axis of the fleshy albumen ; or uncertain in direction and position.

TRIBE I. TULIPACEÆ.

Bulbous. Sepals and petals scarcely adhering in a tube. Integuments of the seed soft and pale.

1. *LILIUM*. *Perianth* campanulate, or funnel-form, colored, of six distinct sepals, spreading or recurved above, with a honey-bearing furrow at the base, deciduous ; the six stamens somewhat adhering to their bases, shorter than the style ; *anthers* linear, versatile. *Style* elongated, somewhat club-shaped ; *stigma* three-lobed. *Capsule* oblong, sub-triangular, the valves connected with latticed hairs, containing numerous, flat, soft-coated seeds, densely packed in two rows in each cell.—Perennial herbs with scaly bulbs, producing simple stems, with numerous, alternate-scattered, or whorled, short, and sessile leaves, and one to several large, terminal flowers.

2. *ERYTHRONIUM*. *Perianth* lily-like, of six distinct, lanceolate sepals, recurved or spreading above, deciduous, the three inner usually with a callous tooth on each side of the erect base, and a groove in the middle. *Stamens* six, inserted in the base of the perianth, shorter than the pistil ; *filaments* subulate ; *anthers* oblong-linear. *Style* furrowed, three-cornered, elongated ; *stigma* either triangular, or consisting of three spreading, channeled plates. *Capsule* turbinate-globose, erect, contracted at the base, three-valved, with the valves bearing the placentæ. *Seeds* rather numerous, ovoid, with a loose membranaceous tip.—Perennial, nearly stemless herbs, with two smooth and shining flat leaves tapering into petioles, and sheathing the base of the one-flowered scape, rising from a deep solid-scaly bulb. Flowers nodding, vernal.

TRIBE II. SCILLEÆ.

Bulbous. Flowers usually small. Integument of the seed black and brittle.

3. *ALLIUM*. Flowers in a dense umbel, with a membranous, two-leaved spathe. *Perianth* of six entirely colored sepals, which are distinct or united at the very base, one-nerved, equal, becoming dry and more or less persistent. *Stamens* inserted on the base of the perianth ; *filaments* either all alike, or the alternate ones tricuspidate ; *anthers* incumbent. *Ovary* angular, three-celled ; *style* subulate ; *stigma* acute, simple. *Capsule* usually obtusely three-cornered or three-lobed, depressed, three-celled, bursting into three valves through the dissepiment.

ments, and containing one or two ovoid-kidney-shaped, campylotropous black seeds in each cell, affixed to the base. *Embryo* falcate, not in the axis.—Strong-scented and pungent stemless herbs; the leaves and scape from a coated bulb; flowers in a simple umbel, some of them frequently changed to bulblets; spathe one or two-valved.

4. *SQUILLA*, or *SCILLA*. *Sepals* three, colored, blue or purple, spreading. *Petals* similar, a little broader. *Stamens* six, shorter than the perianth; *filaments* smooth, somewhat dilated at the base, acuminate, entire. *Ovary* three-parted, glandular, and melliferous at the apex; *style* smooth, simple; *stigma* obscurely three-lobed, papillose. *Capsule* rounded, three-cornered, three-celled. *Seeds* numerous, in two rows, flattened, with a membranous testa.—Bulbous-rooted plants, abounding in an acrid emetic principle.

TRIBE III. CONVALLARINEÆ.

Stem arising from a horizontal rhizoma or tuber.

5. *CONVALLARIA*, or *SMILACINA*. *Perianth* four to six-parted, spreading, deciduous, white, with as many *stamens* inserted at the base of the divisions. *Filaments* slender; *anthers* short. *Ovary* two or three-celled, with two orthotropous *ovules* in each cell; *style* short and thick; *stigma* obscurely two or three-lobed. *Fruit* a globular, one or two-seeded berry.—Perennial herbs, with simple stems from creeping or thickish rootstocks; alternate, nerved leaves; and white, often fragrant flowers in a terminal, simple or compound raceme.

6. *UVULARIA*. This is placed by some authors in order *Melanthaceæ*. *Perianth* nearly campanulate, lily-like; the six sepals spatulate-lanceolate, with a nectariferous cavity at the erect contracted base, much longer than the *stamens*, which barely adhere to their base. *Filaments* very short; *anthers* long, linear, and adnate. *Style* deeply three-cleft; the divisions stigmatic along the inner side. *Capsule* triangular, or three-lobed, three-celled, three-valved from the top. *Seeds* few in each cell, obovoid, with a tumid or fungous raphe.—Rootstock creeping; leaves alternate; flowers pale-yellow, nodding, solitary, or in pairs, on terminal and axillary peduncles.

7. *POLYGONATUM*. *Perianth* tubular, cylindrical, six-lobed at the summit; *stamens* six, inserted near the summit of the tube, included. *Ovary* three-celled, with two to six orthotropous *ovules* in each cell; *style* slender; *stigma* capitate or triangular. *Berry* globular, black or blue, three-celled; *cells* one or two-seeded.—Perennial herbs, with simple, erect or curving stems from creeping, thick and knotted root-

stocks, chiefly alternate and sessile, or half-clasping nerved leaves, and axillary, nodding, greenish flowers.

TRIBE IV. ASPARAGÆ.

Stem usually fully developed, or if not, the leaves are coriaceous and permanent.

8. *ASPARAGUS*. *Perianth* six-parted, spreading above; the six *stamens* at their base, erect. *Ovary* turbinate; *style* very short; *stigma* three-lobed. *Berry* spherical, three-celled; *cells* two-seeded.—Perennials, with much branched stems from thick and matted rootstocks, narrow leaves in clusters, and small, greenish-yellow axillary flowers.

TRIBE V. ALOINÆ.

Stem usually fully developed, sometimes arborescent. Leaves succulent.

9. *ALOE*. *Perianth* tubular, six-cleft, nectariferous at the base; sepals resembling the petals, and closely covering them in an imbricate manner. *Stamens* hypogynous, as long as the perianth, or sometimes longer. *Capsule* membranous, scarious, three-cornered, three-celled, three-valved, with a loculicidal dehiscence. *Seeds* numerous, in two rows, roundish or angular.—Succulent, mostly herbaceous plants, natives of warm climates.

ORDER CVI. HÆMODORACÆ. BLOODWORT.

Herbs with fibrous, perennial roots, and perfect *flowers*. *Leaves* permanent, ensiform, equitant, usually in two ranks. *Perianth* more or less woolly, adherent, the sepals and petals often indistinguishable, and united into a cylindrical tube. *Stamens* inserted on the tube, either three, and opposite the petals, or six; *anthers* dehiscing inwardly. *Ovary* one or three-celled; *cells* one or two, or many-ovuled, with a placenta at one point of the axis; *style* simple; *stigma* undivided; *ovules* amphitropal. *Fruit* capsular, covered with the withered perianth, valvular, seldom indehiscent. *Seeds* definite, or indefinite, fixed by the base or peltate, winged or wrinkled, and angular; *embryo* short, straight, in cartilaginous albumen.

1. *ALETIS*. *Perianth* semi-inferior, tubular, with a six-cleft spreading limb; obscurely hexagonal, not woolly, but wrinkled and roughened externally by thickly-set frosted points, which look like scurfy mealiness. *Stamens* six, inserted at the base of the segments; *filaments* flat; *anthers* somewhat sagittate. *Ovary* three-lobed, pyramidal; *style* awl-shaped, composed of three connate bristles; *stigma* simple, minutely two-lobed. *Capsule* inclosed in the perianth, pyramidal, tricoccous, opening at the apex in three directions. *Seeds* numerous, very minute, striated.—

Perennial and smooth stemless herbs, very bitter, with fibrous roots, and a spreading cluster of thin and flat lanceolate leaves; the small flowers in a wand-like spiked raceme, terminating a long and naked slender scape. Bracts awl-shaped, minute. Placed by some authors in *Liliaceæ*.

ORDER CVII. IRIDACEÆ. CORNFLAG.

Perennial herbs, rarely undershrubs, usually smooth, arising from bulbs, corms, or rhizomas, rarely from fibrous roots. *Leaves* equitant, mostly distichous. *Flowers* with spathaceous bracts. *Calyx* and *corolla* adherent, colored; their divisions either partially cohering, or entirely separate, sometimes irregular, the three petals being occasionally very short. *Stamens* three, inserted at the base of the sepals; *filaments* distinct or connate; *anthers* fixed by their base, two-celled, with an external longitudinal dehiscence. *Ovary* three-celled, *cells* many-ovuled; *ovules* anatropal; *style* one; *stigmas* three, often petaloid, sometimes two-lipped. *Capsule* three-celled, three-valved, with a loculicidal dehiscence. *Seeds* numerous, spheroidal, angular, oblong or winged, attached to the inner angle of the cell, sometimes to a central column, becoming loose; *albumen* horny or densely fleshy; embryo straight, inclosed in it.

1. IRIS. *Perianth* tubular, with a petaloid membranous limb; *sepaloid segments* revolute, often bearded; the *petaloid* erect and converging. *Stamens* three, distinct, placed before the outer divisions of the perianth, and concealed by the lobes of the style. *Style* three-parted near the upper end, with petaloid segments covering the anthers, and having a two-lipped transverse stigma below their apices. *Capsule* three-celled, three-valved, with a loculicidal dehiscence, coriaceous, with numerous flat or round and fleshy seeds.—Perennials with creeping, often tuberous (acid) rootstocks, ensiform leaves, and large showy flowers.

2. CROCUS. *Perianth* funnel-form, colored, tube slender, twice as long as the limb, expanding only in the sunshine; *limb* six-parted, segments equal, erect. *Stamens* three, inserted on the tube; *anthers* sagittate. *Stigmas* three, thick, long, usually crested; *style* filiform. *Capsule* at first subterranean, but by the gradual prolongation of the peduncle finally emerging, three-celled, many-seeded; *seeds* roundish.—Bulbous-rooted plants, with a radicle spathe, one or two-leaved, thin, transparent. Flower-tube nearly or quite sessile upon the bulb. After flowering, the ovary arises from the ground by the growth of the scape, to ripen its seeds in the sun.

ORDER CVIII. DIOSCOREACEÆ. YAM.

Twining shrubs, usually with alternate, reticulately-veined leaves, sometimes opposite. *Flowers* small, spiked, with from one to three

bracts each, diœcious. *Calyx* and *corolla* alike, herbaceous. Males: *stamens* six, inserted into the base of the sepals and petals; *anthers* introrse with a longitudinal dehiscence. Females; *ovary* adherent, three-celled; *cells* with one or two suspended, anatropal ovules; *style* deeply trifid; *stigmas* undivided. *Fruit* leafy, compressed, with two of the cells sometimes abortive; occasionally succulent. *Seeds* one or two in each cell, compressed, winged, or wingless; *embryo* small, near the hilum, lying in a large cavity of cartilaginous albumen.

1. DIOSCOREA. *Flowers* very small, in axillary panicles or racemes. *Stamens* six, at the base of the divisions of the six-parted perianth. *Styles* of the fertile flowers three. *Capsules* three-celled, three-winged, loculicidally three-valved by splitting through the winged angles. *Seeds* one or two in each cell, flat, with a membranaceous wing.—Slender, shrubby climbers, twining with the sun; leaves simple and palmately veined, or palmately divided. Flowers green, inconspicuous, in axillary spikes or panicles.

ORDER CIX. SMILACEÆ. SARSAPARILLA.

Herbs or undershrubs, with a tendency to climb. *Stems* woody. *Leaves* reticulately-veined. *Flowers* diœcious or perfect. *Calyx* and *corolla* very similar, inferior, six-parted. *Stamens* six, inserted on the perianth near the base, seldom hypogynous; *anthers* introrse. *Ovary* three-celled; *cells* one or many-ovuled; *style* usually trifid; *stigmas* three; *ovules* orthotropal. *Fruit* a roundish-berry. *Seeds* few or many; *albumen* between fleshy and cartilaginous; *embryo* very small, distant from the hilum.

1. SMILAX. *Flowers* diœcious. *Perianth* six-parted, nearly equal, spreading. Males; *stamens* six; *filaments* short; *anthers* erect, linear, fixed by the base. Females; *perianth* permanent. *Ovary* three-celled, the cells one-seeded; *style* very short; *stigmas* three, thick and spreading, almost sessile. *Berry* globular, one to three-celled, one to three-seeded. *Seeds* globular, orthotropous, suspended.—Shrubs, or rarely perennial herbs, often evergreen and prickly, climbing by tendrils on the petioles, with yellowish-green stems, cordate or ovate leaves, and small flowers in axillary peduncled umbels.

ORDER CX. MELANTHACEÆ. COLCHICUM.

Perennial herbs, with bulbs, rhizomas, corms, or fasciculated roots. *Stem* simple, often scapiform. *Leaves* sheathing at the base with parallel veins. *Flowers* either arising from under the surface of the ground, or arranged upon tall leafy stems in large panicles, or disposed in spikes or racemes upon a naked scape; perfect, or by abortion, polygamous.

Calyx and *corolla* alike, inferior, petaloid, in six segments, or from cohesion tubular; usually involute in æstivation. *Stamens* six; *anthers* mostly extrorse. *Ovary* three-celled, many-seeded; *style* three-parted; *stigmas* undivided. *Capsule* usually separable into three pieces; sometimes with a loculicidal dehiscence. *Seeds* with a membranous testa; *albumen* dense, fleshy, or cartilaginous; *embryo* very minute.

1. ASAGRÆA. *Flowers* polygamous, naked. *Perianth* six-parted; *segments* linear, veinless, almost equal, with a nectariferous pit at base, equal to the stamens. *Stamens* alternately longer; *anthers* cordate, after dehiscence scutiform. *Ovaries* three, simple, tapering into an obscure stigma. *Fruit* three follicles, acuminate, chartaceous. *Seeds* scimeter-shaped, wrinkled, winged.

2. VERATRUM. *Flowers* polygamous. *Perianth* six-parted; *segments* broad, concave, imbricating, nearly equal, striated, without a pit at the base, spreading, sessile. *Stamens* six, equal, inserted at the base of the segments; *filaments* subulate; *anthers* reniform, with confluent cells. *Ovary* with three divaricating stigmas. *Capsule* three-horned, separating into three, many-seeded follicles. *Seeds* compressed, winged at the apex.—Somewhat pubescent perennials, with simple stems from a thickened base producing coarse fibrous roots, plaited three-ranked leaves, and raceme-panicked flowers.

3. HELONIAS. *Flowers* perfect. *Perianth* of six spatulate-oblong sepals, rather unequal, obtuse, not striated or herbaceous, nor imbricating, persistent, and shorter than the filaments. *Stamens* six, inserted at the base of the segments, unequal; *filaments* subulate; *anthers* reniform, with confluent cells, blue. *Styles* revolute, stigmatic down the inner side. *Capsules* separating into three many-celled follicles. *Seeds* linear, compressed, winged at the apex, or wingless.—A smooth perennial, with many inversely lanceolate, or oblong-spatulate flat leaves, from a tuberous rootstock, producing in early spring a hollow naked scape, sheathed with broad bracts at the base, and terminated by a simple and short dense raceme.

4. COLCHICUM. *Perianth* colored, funnel-shaped, with a very long subterranean slender tube, and a somewhat campanulate, six-parted limb. *Stamens* six, inserted on the throat of the tube. *Ovary* three-celled; *ovules* numerous, in two or four rows; *styles* three, filiform, long; *stigmas* somewhat clavate. *Capsule* three-celled, partible in three, opening inwardly. *Seeds* numerous, roundish, with a corrugated testa.

ORDER CXI. TRILLIACEÆ. TRILLIUM.

Herbs with simple *stems*, tuberous *roots*, and verticillate, net-veined *leaves*. *Flowers* large, terminal, solitary, perfect, trimerous, rarely tetramerous. Sepals and petals three, herbaceous, the latter longest. *Stamens* six to ten; *filaments* subulate; *anthers* linear, with cells on their edges, and the connectile extended. *Ovary* free, three to five-celled; *style* distinct; *stigmas* small; *ovules* many, in two rows, ascending. *Fruit* succulent, three to five-celled. *Seeds* numerous; *embryo* minute, in fleshy albumen.

1. TRILLIUM. *Flowers* perfect; *sepals* three, lanceolate, spreading, herbaceous, persistent. *Petals* three, larger, colored, withering in age. *Stamens* six; *anthers* linear, adnate, on short filaments. *Styles* (or rather *stigmas*) three, awl-shaped or slender, spreading or recurved above, persistent, stigmatic down the inner side. *Berry* three-sided, ovate, three-celled, purple; *seeds* horizontal, several in each cell.—Low perennial herbs, with a stout simple stem rising from a short and abrupt tuberous rootstock, bearing at the summit a whorl of three ample, broadly ovate leaves, and a large, terminal flower.

ORDER CXII. PALMACEÆ. PALM.

Plants with arborescent, simple stems, sometimes shrubby, and occasionally branched. *Leaves* clustered, terminal, very large, pinnate or flabelliform, plaited in veneration. *Spadix* terminal, often branched, inclosed in a one or many-valved spatha. *Flowers* small, hermaphrodite, frequently polygamous, supported by scaly bracts. *Perianth* six-parted, in two series, persistent; the three outer segments (*sepals*) colorless, fleshy or leathery; the inner (*petals*) sometimes deeply connate. *Stamens* inserted on the base of the perianth, usually definite, opposite the segments, to which they are equal in number, seldom three; sometimes indefinite. *Ovary* free, one to three-celled, or deeply three-lobed, the lobes or cells one or two-ovuled; *ovules* erect, orthotropal, or anatropal. *Styles* continuous with the carpels. *Fruit* drupaceous, or nut-like, or berried, often with a fibrous rind. *Seed* filling the cavity, often reticulated. *Albumen* cartilaginous, often ruminated, frequently with a central or ventral cavity; *embryo* lodged in a particular cavity of the albumen, usually at a distance from the hilum, dorsal and indicated by a little nipple, taper or pulley-shaped; *plumule* included, scarcely visible; the cotyledonous extremity becoming thickened in germination, and either filling up a pre-existing cavity, or one formed by the liquefaction of the albumen in the center.

1. ARECA. *Flowers* monœcious. Males; *calyx* three-parted; *corolla* three-petaled. Females; *calyx* three-leaved; *corolla* three-petaled.

Nectary six-toothed. *Ovary* superior, one-celled, one-seeded. *Drupe* coriaceous, containing a single seed, with a ruminated albumen, with the embryo at the base.

2. *SAGUS*. *Flowers* monœcious. Sterile; *calyx* three-toothed; *petals* three. *Stamens* six to twelve; *filaments* distinct, compressed. Fertile; *calyx* three-toothed. *Corolla* campanulate, trifid. *Cup of stamens* six-toothed, with abortive, sagittate *anthers*. *Ovary* three-celled. *Stigmas* three, subulate, connate. *Fruit* one-seeded, coated with reversed scales. *Albumen* ruminated. *Embryo* dorsal, on an umbilical pit.—Leaves pinnated.

CLASS IV. GLUMACEOUS ENDOGENS.

Flowers with glumes; or *floral organs* inclosed in imbricated bracts, and arranged in spikelets, having no proper perianth (calyx or corolla). *Ovary* with one cell containing a solitary ovule and becoming a one-seeded fruit (achenium or caryopsis).

ORDER CXIII. GRAMINACEÆ. GRASSES.

Perennial herbs with fibrous or bulbous rhizomas, often annual or biennial. *Stems (culms)* cylindrical, fistular, closed at the joints or nodes, covered with a coat of silex, often solid. *Leaves* narrow and undivided, parallel-veined, alternate, with a sheath split down to the nodes, and a membranous ligula or stipule at the juncture of the blade and sheath. *Inflorescence* arranged in spikes, racemes, or panicles. *Flowers* generally perfect, in little spikelets (*locustæ*) composed of bracts imbricated in two rows, of which the most exterior are called *glumes*, the interior immediately inclosing the stamens *paleæ*, and the innermost at the base of the ovary *scales*. *Glumes* mostly two, alternate, sometimes single, usually unequal. *Paleæ* two, alternate; the lower or exterior simple, the upper or interior composed of two united by their contiguous margins, and generally with two keels, forming a kind of dislocated calyx. *Scales* two or three, sometimes none; if two, collateral, alternate with the paleæ, and next the lower of them; either distinct or united, *Stamens* hypogynous, one to six, or more, one of which alternates with the two hypogynous scales, and is, therefore, next the lower paleæ; *anthers* versatile. *Ovary* simple; *styles* two, rarely one or three; *stigmas* feathery or hairy; *ovule* ascending, anatropal. *Pericarp* usually indistinguishable from the seed, membranous. *Albumen* farinaceous; *embryo* lying on one side of the albumen at the base, lenticular, with a broad cotyledon and a developed plumula; and occasionally with a second cotyledon on the outside of the plumula, and alternate with the usual cotyledon.

TRIBE I. PHALAREÆ.

Inflorescence in a contracted panicle. Spikelets solitary, with one perfect flower, and one or two imperfect ones. Lower palea awned or mucronate, upper with two keels.

1. *HIEROCHLOA*. *Spikelets* plainly three-flowered, panicle; the *flowers* all with two paleæ; the two *lateral* flowers staminate only, triandrous, sessile, often awned; the *uppermost* (central) one perfect, short-pedicelled, scarcely as long as the others, diandrous, awnless. *Glumes* two, scarious.—Leaves linear, or lanceolate, flat.

TRIBE II. AVENÆ.

Inflorescence paniculate. Spikelets solitary, few-flowered. Glumes and paleæ of similar texture. Upper flowers generally pedicellate, with awn-like processes, or abortive rudiments between the upper and the lower ones. Upper palea with two keels.

2. *AVENA*. *Spikelets* two to five-flowered, panicle, commonly large; the *flowers* herbaceo-chartaceous, or becoming harder, of firmer texture than the large and mostly unequal glumes; the uppermost imperfect. *Lower palea* rounded on the back or keeled, seven to eleven-nerved, bearing a long, usually bent or twisted awn on the back, or below the two-cleft tip, proceeding from the mid-nerve only. *Stamens* three. *Grain* oblong-linear, grooved on one side, usually hairy, free, but mostly invested by the upper palea.

TRIBE III. ORYZÆ.

Spikelets one-flowered; the flowers often monœcious, in branched panicles. Glumes frequently wanting. Inner palea three-nerved. Squamulæ two. Stamens one to six.

3. *ORYZA*. *Glumes* two, one-flowered. *Paleæ* two, subequal, adhering to the ovary. *Stamens* six. *Styles* two.

4. *ZEA*. By some authors this is placed in order *Phalareæ*, and by others in *Olyreæ*. *Flowers* monœcious; *sterile* ones in terminal, paniculate racemes; *spikelets* two-flowered; *glumes* two, herbaceous, obtuse, subequal; *paleæ* membranaceous, awnless, obtuse. *Fertile flowers* lateral, axillary, on a spadix inclosed in a spathe of numerous bracts; *spikelets* two-flowered, one flower abortive; *glumes* two, very obtuse; *paleæ* awnless; *style* one, filiform, very long, pendulous; *caryopsis* compressed; *seeds* immersed in an oblong receptacle.

TRIBE IV. TRITICÆ OR HORDEÆ.

Inflorescence spiked. Spikelets solitary, in pairs, or several together, one, few, or many-flowered. Glumes mostly two, equal and opposite, rarely unequal and alternate. Lower palea awned or awnless, upper one with two keels.

5. TRITICUM. *Spikelets* three, many-flowered; the fructiferous *rachis* generally articulated; *flowers* distichous. *Glumes* two, nearly opposite, almost equal, awnless or awned. *Paleæ* two, herbaceous; the lower awnless, mucronate or aristate at the tip; the upper bicarinate; the *keels* more or less ciliated with aculei. *Stamens* three. *Ovary* pyriform, hairy at the point. *Stigmas* two, terminal, subsessile, feathery; with long, simple finely-toothed hairs. *Scales* two, usually entire and ciliated. *Caryopsis* externally convex, internally concave, and marked by a deep furrow, distinct, or adhering to the paleæ.

6. HORDEUM. *Spikelets* three together, the lateral ones usually withered, two-flowered, with an intermediate floret reduced to a subulate rudiment. *Glumes* two, lanceolate-linear, with subulate awns, flattish, unequal-sided, at right angles with the paleæ, almost on one side, and that the outer side, herbaceous, rigid. *Paleæ* two, herbaceous; the lower one concave, ending in an awn; the upper bicarinate. *Stamens* three. *Ovary* hairy at the apex. *Stigmas* two, sessile, somewhat terminal, feathery. *Scales* two, entire, or furnished with a lateral lobe, usually hairy or ciliated. *Caryopsis* hairy at apex, oblong, furrowed on the inside, adhering to the paleæ, rarely naked.

7. SECALE. *Spikelets* two-flowered. *Florets* sessile, distichous, with a rudiment of a terminal one. *Glumes* two, herbaceous, carinated, almost opposite, awnless or awned. *Paleæ* two, herbaceous; the lower one awned at the point, keeled, and unequal-sided, broadest and thickest on the outer side; the upper shorter and bicarinate. *Stamens* three. *Ovary* pyriform, pilose. *Stigmas* two, subsessile, terminal, feathery, with long, simple, finely-toothed hairs. *Scales* two, entire, ciliated. *Caryopsis* hairy at the point and loose.

TRIBE V. SACCHARÆ.

Fertile paleæ membranaceous or scarious, always of thinner and more delicate texture than the (often indurated) glumes, frequently awned from the tip. Spikelets usually in pairs or threes, paniced, or spiked, some of them entirely sterile (heterogamous).

8. SACCHARUM. Placed by some botanists in Tribe *Rottbællæ*. *Spikelets* all fertile, in pairs, the one sessile, the other stalked, articulated at

the base, two-flowered; the *lower floret* neuter, with one palea; the *upper fertile floret* with two paleæ. *Glumes* two, membranous. *Paleæ* transparent, awnless. *Stamens* three. *Ovary* smooth. *Styles* two, long; *stigmas* feathered, with simple, denticulated hairs. *Scales* two, obscurely two or three-lobed at the tip, distinct. *Caryopsis* smooth? loose?

CRYPTOGAMIA,

Or Flowerless Plants,

Are plants chiefly composed of cellular tissue, without spiral vessels, destitute of true flowers, and producing spores instead of seeds.

CLASS V. ACROGENS.

Flowerless plants with a proper *stem* or *axis*, often with a vascular system composed chiefly of annular ducts, usually furnished with leaves. *Growth* by the extension of the apex, without subsequent increase in diameter. *Spores* with a proper integument, and contained in a vessel analogous to an ovary, called *Theca* or *Sporangium*.

ORDER CXIV. Equisetaceæ. HORSETAIL.

Leafless plants, with simple or verticillate branches; *stems* striate-sulcate, jointed, fistular between the joints and separable at them. *Sheaths* dentate, crowning the summit of each internode. *Inflorescence* (by analogy) a dense, cylindric, terminal spike or strobile. *Scales of the strobile* peltate, hexagonal, subverticillate. *Thecæ* four to seven, attached to the under surface of the scales, with lateral dehiscence. *Spores* numerous, globose, surrounded by minute granules. *Elaters*, bodies of unknown use, consisting of four elastic, clavate filaments involving the spores in a spiral manner.

I. Equisetum. Character the same as that of the order.—Stems striate-grooved, rigid, the hard cuticle abounding in grains of *silex*, hollow, and also with an outer circle of smaller air-cavities corresponding with the grooves; the joints closed and solid, each bearing instead of leaves a sheath, which surrounds the base of the internode above, and is split into teeth corresponding in number and position with the principal ridges of the stem; the stomata always occupying the principal grooves.

ORDER CXV. Filices. FERNS.

Ferns, usually with a creeping rhizome; sometimes with an erect, arborescent *stem*. The *leaves (fronds)* variously divided, rarely entire, with forked veins, mostly circinate in vernation. *Inflorescence* occupying

the back or margin of the fronds arising from the veins. *Thecæ* or *sporangia* of one kind only in the same plant, one-celled, dehiscing irregularly, containing innumerable spores. *Sori* somewhat regular collections or clusters of thecæ; or the thecæ are isolated and scattered. *Indusium* a scale investing each sorus; or the sori are covered with the revolute margin of the frond.

TRIBE I. POLYPODIACEÆ.

Thecæ furnished with a vertical, jointed, elastic, and usually incomplete ring, and bursting transversely and irregularly.

1. POLYPODIUM. *Sori* roundish, naked, variously or irregularly scattered over the back of the flat and expanded leaf-like frond. *Indusium* none. *Veins* simple, forked or pinnate, free, not connected by cross-branches or anastomosing.—Rootstocks creeping, often covered with wool-like chaff, and with tufted branches.

2. ASPIDIUM. *Sori* roundish or elliptical, scattered; *indusium* orbicular and umbilicate, fastened at the center and opening all around, or reniform, fastened on one side and opening on the other.—Frond pinnate or bipinnate.

3. NEPHRODIUM. *Thecæ* placed in the middle of a vein, forming roundish sori placed in two rows. *Indusium* reniform, fixed by the sinus.

4. ASPLENIUM. *Sori* linear or oblong, oblique, or somewhat transverse, separate, not in pairs, all attached lengthwise to the upper side of the simple, forked or pinnate, free veins. *Indusium* arising from the lateral veins, and opening longitudinally, usually toward the midvein.

5. PTERIS. *Sori* linear, confluent laterally in a line which borders the divisions of the frond, the continuous *indusium* fixed at the very margin, the inner edge free. *Veins* forked and free, bearing the *sporangia* at their apex.—Fronds one to three pinnate or decomposed, rather coriaceous.

6. ADIANTUM. *Sori* roundish or crescent-shaped, occupying the edge of the lobes of the frond, the *indusium* appearing as a reflexed edge of it, and bearing the *sporangia* on its under side on the free ends of several simply forking veins. *Midrib* none, or lateral.—Stalk and rachis purplish-black, polished.

TRIBE II. OSMUNDIACEÆ.

Thecæ destitute of a ring, reticulated, striated with rays at the apex, opening lengthwise, and usually externally.

7. OSMUNDA. *Sporangia* globose, short-pedicelled, naked, entirely covering the fertile fronds or pinnæ (which are contracted to the mere rachis), thin and reticulated, not striate-rayed at the apex, opening by a slit into two valves across the apparent top (opposite the pedicel). *Spores* green. *Fronds* tall and upright, from thickened rootstocks, one or two-pinnate; the *veins* forking and free.

CLASS VI. ANOPHYTES.

Cryptogamous acrogenous plants, growing upward by an *axis* or *stem*, and usually furnished with distinct *leaves* composed of cellular tissue alone; sometimes the *stem* and *foliage* confluent into a frond.

ORDER CXVI. MUSCI OR BRYACEÆ. MOSS.

Erect or creeping, terrestrial or aquatic, cellular plants, having a distinct axis of growth, destitute of a vascular system and covered with minute, sessile, imbricated, entire, or serrated *leaves*, producing *spore-cases* which open by a terminal lid, and contain simple spores alone. *Reproductive organs* of two kinds: 1. The *sterile flower* consisting of from four to twenty or more minute cylindrical or fusiform stalked sacs, (*antheridia*) which discharge from their apex, upon the application of water, a mucous fluid filled with oval particles, and then perish. 2. The *fertile flower* composed of from four to twenty or more flask-like bodies (*pistillidia*), each having a membranous covering (*calyptra*) terminated by a long cylindrical funnel-mouthed tube (*style*). The ripened *pistillidium* (seldom more than one in a flower maturing) becomes the *capsule*, which is rarely indehiscent, or splitting by four longitudinal slits, but usually opens by a lid (*operculum*); beneath the operculum and arising from the mouth of the capsule, are commonally either one or two rows of rigid processes (collectively, the *peristome*), which are always some multiple of four; those of the outer row are called *teeth*, of the inner *cilia*. An elastic ring of cells (*annulus*) lies between the rim of the capsule and operculum. The powdery particles filling the capsule are *spores*. The thread-like stalk (*pedicel*) supporting the capsule is inserted into the elongated torus (*vaginula*) of the flower. The pedicel continued through the capsule, (or hollow urn-like case) forms the *columella*; enlarged under the capsule it sometimes forms an *apophysis*. The calyptra separating early at its base is carried up on the apex of the capsule; if it splits on one side it is hoodshaped or *cuculliform*, if not, it is mitre-shaped or *mitriform*. Intermixed with the reproductive organs are cellular jointed filaments (*paraphyses*). The leaves surrounding the antheridia are called the *perigonial* leaves, those around the pistillidia or pedicel the *perichaetial* leaves.

POLYTRICHUM. *Calyptra* densely hairy. *Capsule* four to six-sided, with a discoidal *apophysis*. *Peristome* single, of sixty-four teeth, ad-

herent by their summits to the membranous-dilated apex of the columella. *Lid* beaked. *Inflorescence* dioecious ; *sterile flowers* terminal, cup-shaped.

ORDER CXVII. ALGACEÆ OR CERAMIACEÆ. SEA-WEED.

Sea-weeds, usually of a rose or purplish color. *Cells* long and tubular, or round and short, or polygonal, sometimes arranged in a single row ; sometimes disposed in several parallel rows, forming an *articulated frond*, or if of unequal lengths, forming a *cellular frond*. Their propagation is by *spores* (sphaerospores and tetraspores) collected in fours or threes within a transparent perispore, in bodies of different forms and structure.

1. *FUCUS*. *Frond plane* compressed or cylindrical, linear, dichotomous, coriaceous. *Air-vessels* when present, innate in the frond, simple, large. *Receptacles* terminal, turgid, containing tubercles imbedded in mucus, and discharging their spores (*sporangia*) by conspicuous spores.

2. *CHONDRUS*. *Frond* cartilaginous, dilating upward into a flat, nerveless, dichotomously divided frond, of a purplish, or livid-red color. *Fructification*, subspherical capsules in the substance of the frond, (rarely supported on little stalks) and containing a mass of minute free seeds.

3. *GIGARTINA*. *Frond* horny or cartilaginous, filiform, cylindrical, irregularly branched. *Fructification* uniform ; spherical sessile capsules containing a globose mass of seeds.

ORDER CXVIII. LICHENACEÆ. LICHEN.

Perennial plants, often spreading over the surface of the earth, on rocks or trees in dry places, in the form of a lobed and foliaceous, or hard and crustaceous, or leprous substance called a thallus. This *thallus* is formed of a cortical and medullary layer, of which the former is simply cellular, the latter both cellular and filamentous ; in the crustaceous species the cortical and medullary layer differ chiefly in texture, and in the former being colored, the latter colorless ; but in the fruticulose or foliaceous species, the medulla is distinctly floccose, in the latter occupying the lower half of the thallus, in the former inclosed all round by the cortical layer. *Reproductive* matter of two kinds : 1, *sporules* lying in membranous tubes (*thecae*) immersed in nuclei of the medullary substance, which burst through the cortical layer, and color and harden by exposure to the air in the form of little disks called *shields* ; 2, the separated cellules of the medullary layer of the thallus.

1. *CETRARIA*. *Thallus* foliaceous, cartilagino-membranaceous, ascending and spreading, lobed and laciniated, smooth and naked on each side.

Shields orbicular, obliquely adnate with the margin of the thallus, the lower portion being free, (not united with the thallus); the *disk* colored, plano-concave, with a border formed of the thallus and inflexed.

ORDER CXIX. FUNGACEÆ. MUSHROOM.

Plants consisting of a congeries of cellules, among which filaments are occasionally intermixed, increasing in size by addition to their inside, their outside undergoing no change after its first formation, chiefly growing upon decayed substances, frequently ephemeral, and variously colored. *Sporules* lying either loose among the tissue, or inclosed in membranous cases called sporidia.

AGARICUS, BOLETUS, and SPERMEDIA, belong to this order.

SEXUAL OR ARTIFICIAL SYSTEM OF LINNÆUS.

As the Sexual System of Linnæus is still followed by many, and especially by those who are commencing the study of Botany, the following brief sketch of it is here introduced, as an aid to the Physician in determining medicinal plants, herein described. At the present day, the eleventh, eighteenth, and twenty-third classes of the following table, have usually been omitted, and distributed among the other classes.

CLASSES.

Based upon the number or variations and modifications of the Stamens.

1. MONANDRIA ; one stamen to each flower.
2. DIANDRIA ; two stamens do.
3. TRIANDRIA ; three stamens do.
4. TETRANDRIA ; four stamens do.
5. PENTANDRIA ; five stamens do.
6. HEXANDRIA ; six stamens do.
7. HEPTANDRIA ; seven stamens do.
8. OCTANDRIA ; eight stamens do.
9. ENNEANDRIA ; nine stamens do.
10. DECANDRIA ; ten stamens do.
11. DODECANDRIA ; twelve to nineteen stamens to each flower.
12. ICOSANDRIA ; more than ten stamens on the calyx, (perigynous).
13. POLYANDRIA ; more than ten stamens on the receptacle, (hypogynous).
14. DIDYNAMIA ; four stamens, of which two are long and two short ; usually labiate flowers.
15. TETRADYNAMIA ; six stamens, of which four are long and two short ; usually cruciform flowers.

16. MONADELPHIA ; filaments united into a single set, tube, or column.
17. DIADELPHIA ; filaments united into two sets ; usually papilionaceous flowers.
18. POLYADELPHIA ; filaments united in more than three sets.
19. SYNGENESIA ; stamens united by their anthers into a ring or tube ; usually compound flowers.
20. GYNANDRIA ; stamens consolidated with the pistil or style.
21. MONŒCIA ; stamens and pistils in separate flowers, but on the same plant.
22. DICECIA ; stamens and pistils in separate flowers, and on different plants.
23. POLYGAMIA ; stamens and pistils, in the same or separate flowers, and on the same or on different plants ; varying.
24. CRYPTOGAMIA ; stamens and pistils wanting or invisible.

ORDERS.

Founded upon the modifications of various parts of the flowers, as the Styles, or where these are wanting, the Stigmas, also the Seeds, Pods, etc.

1. MONOGYNIA ; includes all the genera of plants in either of the first thirteen classes, with one style or stigma to the flower.
2. DIGYNIA ; do. with two styles or stigmas.
3. TRIGYNIA ; do. with three styles do.
4. TETRAGYNIA ; do. with four styles do.
5. PENTAGYNIA ; do. with five styles do.
6. HEXAGYNIA ; do. with six styles do.
7. HEPTAGYNIA ; do. with seven styles do.
8. OCTAGYNIA ; do. with eight styles do.
9. ENNEAGYNIA ; do. with nine styles do.
10. DECAGYNIA ; do. with ten styles do.
11. DODECAGYNIA ; do. with eleven or twelve styles do.
12. POLYGYNIA ; do. with more than twelve styles do.

The fourteenth class has two orders, viz :

GYMNOSPERMIA ; with seeds naked, or apparently so.

ANGIOSPERMIA ; with seeds in a seed-vessel, or pericarp.

The fifteenth class has also two orders, viz :

SILICULOSA ; the fruit a silicle or short pod.

SILIUOSA ; the fruit a silique or long pod.

The sixteenth, seventeenth, eighteenth, twentieth, twenty-first, and twenty-second classes, have their orders founded on the number of stamens to the flower, the order bearing the name of the first thirteen classes; thus the sixteenth class flower with three stamens would be named MONADELPHIA TRIANDRIA, etc.

The nineteenth class has its orders founded upon the character of its flowers, thus :

POLYGAMIA ÆQUALIS ; flowers in heads, and all perfect.

POLYGAMIA SUPERFLUA ; florets of the rays, or margin of the head pistillate ; the rest perfect.

POLYGAMIA FRUSTRANEA ; florets of the margin neutral, the rest perfect.

POLYGAMIA NECESSARIA ; florets of the margin pistillate and fertile, the rest or disk-flowers staminate and sterile.

POLYGAMIA SEGREGATA ; each flower having its own proper calyx or involucre.

MONOGAMIA ; flowers solitary, but with united anthers.

The twenty-third class has its orders founded on the characters of the two preceding classes, thus ;—

MONŒCIA ; where both separated and perfect flowers are found on the same plant.

DICŒCIA ; where the different flowers are found on different plants.

TRICŒCIA ; where perfect flowers are found on one plant, staminate on another, and pistillate on still another.

The twenty-fourth class has its orders, based upon the natural character of the plants ; they are :—

FILICES ; ferns.

MUSCI ; Mosses.

HEPATICÆ ; liverworts.

ALGÆ ; seaweeds.

LICHENES ; lichens.

FUNGI ; mushrooms or toad-stools.

PART II

MATERIA MEDICA.

ABELMOSCHUS ESCULENTUS.

Okra.

Nat. Ord.—Malvaceæ. Sex. Syst.—Monadelphia Polyandria.

FRUIT.

Description. This is an Annual plant, known also by the name of *Gombo*, and is the *Hibiscus Esculentus* of some authors. The stems are somewhat woody toward the base, erect, branched, round, from three to six feet in height, and three or four inches in diameter. The herbaceous part is covered with sharp bristles, and often bears purplish spots. The leaves are alternate petioled; the lower ones being angular, the central ones palmate, and the upper ones subdigitate, the divisions being lanceolate-oblong; all are serrate and somewhat bristly. The petioles are round, bristly, and as long as the leaves. The flowers are very large, axillary, solitary, on short peduncles, of a pale-yellow color, with a dark-crimson bottom. Involucre one, from six to twelve-leaved; leaflets linear, bristly, deciduous. The calyx spathiform, of a very soft texture, bursting lengthwise on one side; stigmas equal to the cells in the capsule. Capsule six to twelve inches in length, about one inch in diameter, somewhat bristly, especially the ridges, equal in number to the cells and valves, with a single row of round, smooth seeds in each cell.

History. This plant is a native of the West Indies, and is also cultivated in the Southern States, where the capsule is much employed in soups, and for pickles. The capsule is the part employed, and abounds in mucilage. The *Hibiscus Abelmoschus*, or *Abelmoschus moschatus*, a foreign evergreen shrub, grows in various parts of the world, in Egypt, the East and West Indies, etc., and affords the seeds known under the names of *Semen Abelmoschi*, *alceæ Egypticæ*, and *grana moschata*. These are about the size of flaxseed, reniform, striated, of a grayish-

brown color, a musk odor, and a warm rather spicy taste, and are used by the Arabs to flavor their coffee.

Properties and Uses.—Okra is mucilaginous, and may be employed wherever emollients and demulcents are indicated; the leaves are occasionally employed for preparing emollient poultices. The seeds of the foreign plant were formerly considered stimulant and antispasmodic; but are at present only used in perfumery.

ABIES BALSAMEA.

Balm of Gilead.

Nat. Ord.—Pinacæ. *Sex. Syst.*—Monœcia Monadelphica.

JUICE, OR RESINOUS EXUDATION.

Description.—This is an elegant tree, rising from twenty to forty feet in height, and of a pyramidal form. It is also known by the name of *American Silver Fir*. The leaves are from six to eight lines in length, solitary, flat, either acute or emarginate, entire, glaucous, silvery-white beneath, and on their upper surface, glaucous, shining, dark-green; somewhat pectinate, suberect above, sometimes curved to one side, and spreading more or less perfectly in two rows on the sides and tops of the branches. The male flowers are yellow, numerous, axillary, solitary, and about as long as the leaves; the female catkins are lateral, cylindrical, erect, and green; the bracts abbreviate, obovate, mucronate, and subserrulate. The cones are large, cylindrical, erect, of a purplish color, and covered with a resinous exudation, which gives them a glossy, rich and elegant appearance.

History.—This tree inhabits Canada, Nova-Scotia, Maine, and mountainous regions further to the South. It furnishes the *Canada Balsam*, also called *Balsam of Fir*, or *Canada Turpentine*. The vesicles which naturally form upon the trunk and branches are broken, and their liquid contents received into a bottle.

Canada Balsam is a transparent fluid, or nearly so, colorless, or of a pale-yellow tint, tenacious, of the consistence of thin honey, of a strong, agreeable, terebinthine odor, of a slightly bitter and not very acrid taste, and very slow to consolidate. On exposure to the air, it gradually becomes concrete, owing partly to the escape of volatile oil, and partly to its conversion into resin. A moderate heat renders it completely liquid; a higher heat gives off volatile oil, leaving behind resin somewhat empyreumatised. The same result takes place when boiled with water, and the remaining unevaporated water holds a little succinic acid in solution. It is readily inflammable, burning with a dense reddish flame, and much black smoke. It is partially soluble in alcohol; and a part of its resin forms a soluble soap with solution of potassa. It has not

been satisfactorily analyzed. Bonastre obtained from 100 parts, 18.6 of volatile oil, 40.0 of resin soluble in alcohol, 33.4 of sub-resin, nearly insoluble in alcohol, 4.0 of caoutchouc, 4.9 of bitter extractive and salts, and traces of acetic acid. Its therapeutical influence upon the system is owing to its essential oil. The name *balsam* is improperly applied to it, as it consists chiefly of resin and essential oil, and contains no cinnamic acid, nor benzoin.

Properties and Uses.—Canada Balsam is stimulant, diuretic, anthelmintic, and in large doses, cathartic; it acts more especially on the mucous tissues of the system, and if its use be continued too long, or in too large doses, it will irritate these tissues more or less, especially those of the urinary organs, producing strangury; if, however, it should act as a laxative, this irritation is not apt to follow. It has been advantageously employed internally in gonorrhea, gleet, leucorrhea, piles, chronic urinary difficulties, chronic inflammations or ulcerations of the bowels, chronic catarrhal affections, and rheumatism. In gonorrhea, where the use of copaiba is not desirable, I have found the Canada Balsam an excellent substitute in the following combination, viz: Take of Canada Balsam two fluidounces, Oil of Turpentine four fluidrachms, Spirits of Nitric Ether eight fluidounces, Pulverized Camphor, two drachms; mix these together. The dose is a fluidrachm three times a day. In cases where the inflammatory symptoms have been subdued, pulverized Kino, two drachms, may also be added.

Externally, Canada Balsam acts as a rubefacient, and is frequently employed as a stimulant to wounds and ulcers; it likewise enters into the composition of several salves and irritating plasters. Dose, from ten to twenty grains two or three times a day, in pills or in emulsion.

ABIES CANADENSIS.

Hemlock Spruce.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphica.

THE PREPARED CONCRETE JUICE, CANADA PITCH, GUM HEMLOCK.

Description.—This tree sometimes attains the height of eighty feet, with a trunk two or three feet in diameter. The *leaves* are very numerous, about half an inch in length, linear, flat, obtuse, denticulate, and irregularly arranged in two rows. The *cones* or *strobiles*, are oval, of few scales, pendulous, about three-quarters of an inch long, and terminal or at the ends of the branches.

History.—The foliage of this tree is delicate, bright green above, and silvery-white underneath. Hemlock Spruce is abundant in Canada, Nova Scotia, and the elevated and mountainous regions of New England and the Middle States. Its timber is very coarse-grained, and its bark contains an

astringent principle, and is much used for tanning purposes. The pitch or juice exudes spontaneously, and hardens upon the bark, from which it is obtained by boiling fragments of the bark thus incrustated, in water, and skimming off the pitch which rises to the surface. A second boiling still further purifies it.

Canada Pitch is hard, brittle, quite opaque, of a dark yellowish brown color, which becomes still darker by exposure to the air; of a weak, peculiar odor, and scarcely any taste. It softens and becomes adhesive with a moderate heat, and melts at 198° F. It consists of resin, and a small portion of essential oil.

Properties and Uses.—Gum Hemlock is a gentle rubefacient, and is sometimes employed for the same purposes as *Burgundy pitch*, which it resembles in its properties. The tincture of the hemlock pitch is diuretic and stimulant. The volatile oil, *oil of hemlock*, has been used to produce abortion, but it is dangerous. As a liniment, this oil has been used in croup, rheumatism, and other affections requiring a stimulating local application. The essence of hemlock is diuretic and stimulant; Dr. W. K. Everson states it to be a superior remedy in gastric irritation, to allay vomiting in cholera-morbus, etc.; the dose is five or ten drops in water, every ten or twenty minutes, until relief is afforded. I have found the following preparation very beneficial as an internal agent, in rheumatism, colic, flatulency, acid-stomach, pains or soreness of the chest or stomach, languor, depression of spirits, hysterics, pyrosis, and many other chronic and painful affections. Take of Balsam Tolu, Gum Guaiacum, Gum Hemlock, Gum Myrrh, of each, coarsely powdered, two ounces, Oil of Hemlock three ounces, Oil of Wintergreen two ounces, Alcohol one gallon. Mix and allow them to macerate for two weeks, frequently agitating. The dose is a fluidrachm in half a wine-glass of sweetened water; or in severe cases, it may be increased to half an ounce. I have employed this preparation for several years, and can confidently recommend it to the profession as an effectual agent in the above disorders. A strong decoction of the bark of this tree is beneficial in leucorrhea, prolapsus-uteri, diarrhea, etc., administered internally, and used in enema; it is likewise of service, as a local application, in gangrene.

ABIES EXCELSA.

Norway Pine.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE CONCRETE JUICE. BURGUNDY PITCH.

Description.—This tree, also called *Norway Spruce Fir*, has a trunk from three to five feet in diameter, and sometimes attains the height of

one hundred and fifty feet. The *leaves* are short, obscurely four-cornered, often curved, of a dusky green color, shining on the upper surface, and stand thickly upon the branches. The *male catkins* are purple, axillary, and solitary, scales stamiferous at the apex; the *female catkins* are usually purple, terminal, and simple; *ovaries* two; *stigmas* glandular; *cones*, with imbricated scales, which are thin at the apex, and rounded, pendent and purple.

History.—The Norway Pine is a native of Europe and Northern Asia; and, as well as the *Abies Picea*, or European silver fir-tree, furnishes the Burgundy pitch of commerce. The pitch is obtained by allowing the turpentine, which flows from incisions, to harden on the bark, and then purifying it by melting it in water, and passing it through a cloth.

Pure Burgundy pitch is hard, brittle, quite opaque, of a yellowish or brownish color, and a sweet, perfumed, weak, terebinthinate taste, without bitterness, and a strong, peculiar, balsamic odor. It is very fusible, and at the heat of the body softens and becomes adhesive. It contains a minute proportion of essential oil. As brought to this country, it is generally mixed with impurities; the true pitch is seldom met with, spurious sorts being substituted, made by melting together pitch, resin, and turpentine, and agitating the mixture with water. The spurious kind may be known by their different odor, their bright yellow color, their numerous vesicles, and by the aqueous vapor they yield when heated.

The resinous exudation from this tree, in the form of concrete tears, is the *Thus* or Frankincense of commerce, or *Abietis Resina*.

Frankincense is in solid, brittle tears, externally brownish-yellow, paler internally, and emitting an agreeable odor when burned; at the temperature of the body, it softens and becomes adhesive. It is used only as an ingredient in plasters.

Properties and Uses.—A gentle rubefacient, similar to the *Canada pitch*. It is applied externally in form of a plaster, and produces a slight degree of inflammation and serous effusion, without separating the cuticle. Sometimes it excites a papillary or vesicular eruption, and has been known to create excessive pain, tumefaction, and redness, followed by vesication and even ulceration. Used chiefly in chronic rheumatic pains, and chronic affections of the chest or abdominal viscera. It enters into several salves and plasters.

Off. Prep.—Emplastrum Picis Compositum; Emplast. Resinæ Composit.; Linimentum Olei Composit.; Liniment. Cajuputi Composit.; Liniment. Camphor. Composit.

ABIES LARIX.

Larch.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.RESINOUS EXUDATION. VENICE TURPENTINE. (See *Oleum Terebinthineæ*.)

Description.—The Larch is a tree of straight and lofty growth, with wide-spreading branches, whose extremities droop in the most graceful manner. The *buds* are alternate, perennial, cup-shaped, scaly, producing annually a pencil-like tuft of very numerous, spreading, linear, bluntish, entire, smooth, tender, bright-green, deciduous *leaves*, about an inch long. *Male flowers*, drooping, about half an inch long, yellow; *female catkins*, erect, larger than the male flowers, and variegated with green and pink; *cones*, erect, ovate, about an inch long, purple when young, reddish-brown when ripe, their *scales* spreading, orbicular, slightly reflexed, and cracked at the margin. It is a native of the mountainous regions of the north and middle of Europe.

History.—The trunk of the tree furnishes *Venice Turpentine*; and a peculiar saccharine substance exudes from the branches, called *Manna of Briançon*. When the larch forests in Russia take fire, a gum issues from the trees during their combustion, which is termed "*Gum Orenberg*," and which is wholly soluble in water like Gum Arabic.

Genuine Venice Turpentine is a viscid liquid, of the consistence of honey, of a yellowish or slightly-greenish color, and imperfectly transparent; it flows with difficulty, has a strong, not disagreeable odor, and a warm, bitterish, and very acrid taste. It is wholly soluble in alcohol. The factitious Venice turpentine is of a brownish color, and is made by dissolving resin in oil of turpentine.

Properties and Uses.—(See Oil of Turpentine.)

Off. Prep.—Unguentum Stramonii Compositum.

ABIES NIGRA.

Black Spruce. Double Spruce.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.

DECOCTION OF BRANCHES. ESSENCE OF SPRUCE.

Description.—This tree grows in the northern parts of this continent, and in elevated situations in the Middle States. It attains the height of from forty to seventy feet, having very dark-green *leaves*, short, erect, rigid, and the *cones* one or two inches long, reddish-brown, ovate, and their *scales* wavy and toothed at the apex.

Properties.—The *extract* or *Essence of Spruce* is made from the young branches, by boiling them in water, straining and evaporating. From this Spruce Beer is made; an agreeable and not unwholesome summer drink. It is made as follows: Take of essence of spruce half a pint, bruised ginger, pimento, and hops, of each, four ounces, water three gallons. Boil for ten or fifteen minutes, then strain, add of warm water, eleven gallons, molasses, six pints, and yeast, a pint; mix, and allow the mixture to ferment for twenty-four hours.

ABIES PICEA.

Silver Pine.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.

STRASBURGH TURPENTINE.

Description.—This tree, also known as *Silver Fir*, grows in the mountains of south and central Europe, and resembles the *Abies Balsamea*, but differs in not having its *bracts* so sharp pointed, its *cones* less acute at each end, and the *crest of its anthers* pointed. It affords the “Strasburgh Turpentine.”

Properties and Uses.—(See Oil of Turpentine.)

ACACIA ARABICA. (*Acacia Vera*.)

Acacia.

Nat. Ord.—Fabaceæ, or Leguminosæ. *Tribe.*—Mimoseæ. *Sex. Syst.*—Polygamia Monœcia.

THE CONCRETE JUICE. GUM ARABIC.

Description.—*Acacia Arabica*, also known by the name of *Egyptian Thorn*, or *Egyptian Gum Arabic* is a small tree or shrub, but which sometimes attains the height of forty feet, with a trunk from twelve to sixteen inches in diameter. The *leaves* are alternate and doubly pinnate, with four or six pairs of pinnae, each being composed of from ten to twenty pairs of minute, smooth, oblong, linear *leaflets*, with a gland on the common petiole, below the first, and generally one between the last pair of pinnae. *Spines* straight and in pairs. *Flowers* yellow, in globose, pedunculated, axillary, subternate heads. The *Legume* is moniliform.

Acacia Vera is a tree of middling size, with a crooked stem covered with a smooth gray bark, numerous scattered branches covered with a yellowish-green or purplish bark. The *leaves* are alternate, bipinnate,

and composed of two pairs of opposite pinnæ, with numerous, small, oblong, linear, and smooth *leaflets*, supported on very short footstalks; on the common petiole, and between each pair of pinnæ, is a gland. The *flowers* are bright yellow, inodorous, small, and collected in globular heads about two together, and supported on slender, axillary peduncles, and furnished with two small bracts. The *branches* and *petioles* are glabrous; the *spines* are in pairs, sharp, and from three to six lines long, and are situated at the insertion of each leaf, being united at their base. The *legume* is four or five inches long, moniliform, smooth, flat, of a pale-brown color, and divided into several orbicular portions, in each of which is contained a single, flattish seed. The best quality of Gum Arabic is obtained from this tree.

History.—These trees grow in upper and lower Egypt, Senegal, and other parts of Affica, also flourish in Arabia, and in Hindostan, where their gum is used for food by the natives. The *A. Arabica* is the most widely diffused of the gum-bearing trees. Gum Arabic is likewise obtained from several other species of Acacia, but not so largely as from the two above-named. The gum of the Acacias exudes spontaneously from the bark of the trunk and branches, and hardens on exposure; but incisions are sometimes made in order to facilitate the exudation. It exudes from the trees in the form of a thick and somewhat frothy juice, soon after the rainy season has softened their bark, and rendered it apt to split during the hot weather that succeeds. It is secreted in greatest abundance by old stunted trees, and in dry, hot seasons, and is thought by some to be the result of disease.

The best quality of Gum Arabic has a very pale, straw color, breaks with a vitreous fracture, is transparent, inodorous, insipid, and feels quite viscid in the mouth. It is generally in small, round, irregular lumps, of easy fracture. Its colored varieties are bleached by exposure to the light of the sun. Its specific gravity varies from 1.3 to 1.4. In powder it is always white.

Gum Arabic is soluble in cold or hot water, forming a viscid solution called mucilage, which, when evaporated, yields the gum unchanged. It is insoluble in alcohol, ether, and the oils, and is precipitated from its aqueous solution by alcohol. Concentrated acids decompose it. A solution of borax coagulates it. It unites with sugar in solution, which when evaporated yields an uncrystallizable, transparent, solid substance. It is also soluble in dilute acids, solutions of the pure alkalies, and lime-water.

A concentrated aqueous solution of Gum Arabic may be kept a long while, unless the weather be very hot, in which event it will ferment. A weak solution ferments speedily, and acetous acid is developed. Nitric acid changes pure gum into mucic or saccho-lactic acid. Analysis shows it to contain bi-malate, and muriate of lime, muriate and acetate of potassa, and some other matters.

Properties and Uses.—Nutritive and demulcent. Used in irritations or inflammations of mucous surfaces; as, hoarseness, sore-throat, cough, gonorrhea, catarrh of the urinary bladder, dysentery, diarrhea, stranguery, and tenesmus. It may be given, *ad libitum*, in the form of solution or lozenge; as an article of diet in cases requiring a rigid regimen, as in fevers, it is superior to any other substance; it may be used for this purpose by dissolving the gum in powder, half an ounce, in five ounces of water, and sweetening with loaf-sugar, of which a tablespoonful may be given every two or three hours; in low stages of fever, in typhoid fever, and wherever a mild stimulant is required, one ounce of a saturated solution of camphor in sulphuric ether may be added to the above, and administered in the same way; it is diuretic, promotes the action of the absorbents, and does not materially increase arterial action. Equal parts of pulverized alum and Gum Arabic form a good preparation to check hemorrhages from small cuts, wounds, etc.

Externally, the application of its solution to burns and scalds has proved serviceable, repeating it until a complete coating is secured. It is likewise much used for compounding pills, lozenges, mixtures and emulsions; also for administering insoluble substances in water, as oils, resins, balsams, camphor, musk, etc.

MUCILAGE OF GUM ARABIC.—To four ounces of finely pulverized Gum Arabic, add, very gradually, a pint of boiling water, and rub the whole until perfectly blended. Dose, *ad libitum*. When Gum Arabic is adulterated with cherry gum, it is not easy to form a good mucilage; the *cerasin* of the cherry gum will cause it to be ropy.

ACACIA CATECHU.

Catechu. (*Cutch. Gamber. Terra Japonica.*)

Nat. Ord.—Fabaceæ, or Leguminosæ. *Tribe.*—Mimoseæ. *Sex. Syst.*—Polygamia Monœcia.

EXTRACT OF THE WOOD.

Description.—The Acacia Catechu is a small tree, seldom more than twelve feet high, and with a trunk one foot in diameter. The bark of the tree is thick, scabrous, ferruginous, red within, very astringent and somewhat bitter. The branches are spreading and irregular, and when young, pubescent; the older ones have many stipular prickles, in pairs and recurved. The leaves are alternate, and consist of ten to thirty pairs of pinnæ about two inches long, each having many small, linear leaflets, covered with short hairs, and of a pale-green color. At the base of each pair of pinnæ is a small gland upon the common petiole, and attached to the stem at the base of each leaf, are two short, recurved spines. The flowers are numerous, axillary, in slender cylindrical spikes,

about four or five inches long, and of a pale-yellow color. The *calyx* tubular, hairy, and five-toothed. The *corolla* is composed of five petals, united into a tube at the base, and is longer than the calyx. *Stamens* numerous, distinct, with roundish anthers. The *ovary* is green, oval, glabrous, supporting a slender style, and terminated by a simple stigma. The *legume* is lanceolate, flat, straight, smooth, and brown, with an undulated thin margin, containing six or eight roundish, flattened seeds, which emit a nauseous odor when chewed.

History.—This species of *Acacia* is a native of the East Indies, growing abundantly in Hindostan and in the Burman empire. The official catechu is prepared by boiling the leaves or wood in water, then evaporating to the proper consistence, and pouring into quadrangular earthen molds. Catechu is likewise obtained from the *Areca Catechu* and *Uncaria Gambir*. There are several kinds of it met with in commerce, but the best is that which possesses the most astringency, and which can be determined by the taste.

Catechu varies in its color and appearance, being from pale to a dark-brown, in square, round, and irregular pieces, friable, specific gravity 1.2 to 1.3, inodorous, astringent, and succeeded by an agreeable sweet taste. That which is preferred is of a dark color, easily broken into small angular fragments, with a smooth, glossy surface, bearing some resemblance to Kino. It is soluble in hot water, which deposits a reddish matter on cooling. Cold water partially dissolves it. Alcohol or proof spirit dissolves it readily. It contains tannin, extractive, and mucilage. Ether dissolves its tannin and catechuic acids. The dark-colored catechu is the most astringent.

It is *incompatible* with solutions of the pure earths, with sulphuric acid or muriatic acids, salts of alumina, lead, copper, and of the sesquioxide of iron, also with gelatin, opium, cinchona, and those salts of the vegetable alkaloids, which form insoluble salts with tannin.

Properties and Uses.—Catechu is a pure and powerful astringent, and slightly tonic. It is used for arresting mucous discharges when excessive, for removing relaxation or congestion of mucous membranes, and for checking hemorrhages. In chronic diarrhea, chronic catarrh, colliquative diarrhea, and chronic dysentery, it has proved beneficial especially when combined with opium. As a local application it is a valuable agent for removing cynanche tonsillaris, aphthous ulcerations of the mouth, elongation of the uvula, and relaxation and congestion of the mucous membrane of the fauces, especially of the kind to which public singers are subject; it is also useful in congestion, tenderness and sponginess of the gums, particularly when the result of mercurial ptyalism. The tincture of catechu is often useful in fissure of the nipples, when applied twice a day with a fine hair pencil. Catechu is likewise beneficial as a topical application to ulcers of a phagedenic character, and to indolent ulcers. An infusion of catechu may be used as an injection in

obstinate gonorrhea, gleet, and leucorrhea; and thrown up the nostrils is beneficial in epistaxis. The dose of powdered catechu is from ten to thirty grains, frequently repeated, and is best given with sugar, gum arabic, and water; dose of the tincture from one drachm to half a fluid-ounce.

ACETUM.

Vinegar.

IMPURE DILUTE ACETIC ACID, PREPARED BY FERMENTATION OF CIDER, MALT, OR WINE.

ACETUM BRITANNICUM.—Common British made Vinegar, from infusion of malt. Density, 1006 to 1019.

ACETUM DESTILLATUM.—Distilled Vinegar.

ACETUM GALLICUM.—French Vinegar; density, 1014 to 1022.

ACETUM VINI.—Wine Vinegar.—Impure Dilute Acetic Acid.

History.—Sugar and water, and all saccharine vegetable juices, infusion of malt, wine, cider, and all liquors susceptible of vinous fermentation, may be converted into vinegar, by being exposed to a temperature between 75° and 90° F. with access of air, in which they undergo an action called acetous fermentation, and which is developed under a microscopic fungus influence, termed *torula aceti*. The several changes which occur during this fermentation, are included in the term *acetification*; during the progress of which, heat is disengaged, the liquid becomes turbid, and filaments are formed, which move in numerous directions, and finally, the liquid becomes transparent, with a pultaceous deposit of the filaments, its alcohol has disappeared, and vinegar now occupies its place.

This change is supposed to take place, in consequence of the formation of a new substance called *Aldehyd*, the result of the loss of a part of the oxygen of the alcohol. Alcohol consists of four equivalents of carbon, six of hydrogen, and two of oxygen, through the action of the atmosphere, it loses two equivalents of hydrogen, and becomes aldehyd. This, absorbing two equivalents of oxygen, becomes hydrated acetic acid, consisting of four equivalents each of carbon, hydrogen, and oxygen. *Aldehyd* is an ethereal fluid, very inflammable, colorless, with a pungent taste and smell; its density is 0.79. It absorbs oxygen with avidity. Its name has reference to its character, *alcohol dehydrogenated*. *Aldehyd resin*, a soft, light-brown mass, giving a nauseous soapy smell when heated to 212°, and is formed by decomposing the aqueous solution of aldehyd by caustic potassa.

Different liquors are employed in the manufacture of vinegar, in different countries; in wine countries, wine is used; in Britain, infusion of malt; in the United States, cider is principally used. The cider is placed in barrels with their bung-holes open, and which are then exposed to the heat of the sun, during summer, and the acetification is perfected in about two years. This fermentation must be watched during its progress, and as soon as the vinegar is formed, it must be racked off into clean barrels, otherwise it will become spoiled by running into the putrefactive fermentation.

Vinegar is also made by various other methods, many of which require a comparatively short time for its formation. A tumbler full of boiling milk added to fifty gallons of vinegar, and stirred into it, will clarify it, without injuring its aroma, and will also render red vinegar pale.

Good vinegar is of an agreeable, penetrating odor, and pleasant acid taste; its color varies from pale-yellow to red, and when long kept, it becomes turbid and ropy, putrefies, becomes fetid, and loses its acidity, more especially if exposed to the air. Malt vinegar is usually of a yellowish red color; containing from 4 to 5 per cent. of acetic acid; wine vinegar is white or red, according to the wine it is prepared from, and is about one-sixth stronger than malt vinegar. White wine vinegar is preferred to the red, which last may be rendered pale by passing it through animal charcoal.

Vinegar may contain sulphuric acid, copper, and lead, which are its most dangerous impurities. The want of action of acetate of lead proves it free from the first; the second may be detected by the addition of ammonia in excess, which renders the acid blue, if copper be present; and iodide of potassium will detect lead by throwing down the yellow iodide of lead.

Properties and Uses.—Refrigerant, diuretic, astringent, and tonic. Useful in febrile and inflammatory complaints, especially when the tongue is coated dark or brown; also in typhus and scurvy, as an antiseptic. In urinary affections, attended with a white sediment, consisting mainly of phosphate of lime, and ammoniaco-magnesian phosphate, it has been recommended. In dysentery and scarlatina, vinegar saturated with common house salt, has been very beneficial. A large tablespoonful of the mixture must be added to four of hot water, of which a tablespoonful is to be taken, as hot as may be, every two or three minutes, till the whole is consumed. A similar preparation was found very effectual in the treatment of Asiatic cholera, in Cincinnati, during 1849–50, and is also asserted to have proved a useful local application in external inflammations, sprains, bruises, swellings, etc. The vapor of vinegar inhaled into the lungs, is useful in diseases of these organs, dryness and irritation of the pulmonary tubes during measles and other exanthematous and febrile diseases, also in sore-throat; and diffused through the

rooms of the sick, it is both agreeable and wholesome to the patient and attendants.

Vinegar has been used as a gargle, or its vapor inhaled, in putrid sore-throat, ulceration of the fauces, hoarseness, etc.; it has also been applied locally in some cases of ophthalmia, in epistaxis, several cutaneous diseases, and, diluted with water, has been used as an injection into the rectum in hemorrhoidal affections, and into the uterus in cases of uterine hemorrhage. It forms a valuable adjuvant to cooling lotions. The dose internally is from one to four fluidrachms; as an injection, one or two fluidounces diluted with twice or thrice its bulk of water.

Distilled Vinegar is used for the same purposes as above, and is the solvent to be employed in making the various medicated vinegars of opium, squill, colchicum, etc. Care must be taken, when using vinegar medicinally, not to obtain the spurious and adulterated articles, containing sulphuric acid, muriatic acid, nitric acid, copper, lead, etc. One part of acetic acid to five of distilled water, forms a very good vinegar, for culinary and medicinal purposes.

Off. Prep.—Acetum Emeticum; Acetum Lobeliæ; Acetum Sanguinariæ; Acetum Scillæ; Tinctura Opii Acetata; Tinctura Sanguinariæ Acetata; Lotio Refrigerans; Lotio Lobeliæ Compositum.

ACHILLEA MILLEFOLIUM.

Yarrow.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE HERB.

Description.—Yarrow, also called *Milfoil*, is from twelve to eighteen inches high, with simple stems, branching at top. The leaves are doubly pinnate, crowded, alternate, with linear, dentate, mucronate segments. The flowers are white or rose-colored, and are arranged in a dense, flat-topped, compound corymb; involucre oblong and imbricated. Rays four or five, short; receptacle chaffy, small, flattish. Achenium oblong, flattened, margined.

History.—Yarrow is a perennial herb, common to Europe and North America, growing in fields, woods, pastures, etc., and flowering nearly the whole summer. The American plant is the most active. The flowers and leaves have an agreeable, but feeble aromatic odor, and a bitter, astringent, pungent taste. It contains a volatile oil, bitter extractive, tannin, and achilleic acid. The active principles are extracted both by water and alcohol.

According to M. Zanon, the active principle of this plant, *Achilleine*, has been used as a substitute for sulphate of quinia in intermittent

fevers, in the south of Europe. It is prepared by boiling five pounds of the dried plant with sixteen pounds of rain-water for about two hours. The residue is again boiled twice with smaller quantities of water, the decoctions are then filtered and mixed. These are then clarified with white of egg, and evaporated at a gentle heat until a whitish pellicle is formed on the surface. After twenty-four hours the cold liquid deposits a mass consisting for the most part of vegetable fiber, green coloring substance, with some coagulated albumen, extractive matter insoluble in alcohol, lime-salts, and traces of silica. The bitter and acid liquid is filtered, and then treated with an excess of hydrate of lime, which produces a white precipitate; upon this the liquid is treated with acetate of lead as long as any precipitate is formed. This precipitate is collected on a filter, and the solution saturated with sulphureted hydrogen, after which it still possesses a yellowish color and a very bitter taste. On evaporation it yields nearly half a pound of dry extract, which, as well as the previously-filtered sulphuret of lead, are exhausted with alcohol. The two, mixed and evaporated, yield about seven ounces of achilleine.

The achilleine obtained in this manner, contains some acetate of lime, resin, etc., but which may be avoided by treating the neutralized decoction (above, by hydrate of lime) with animal charcoal, then evaporating to dryness, and finally extracting with boiling absolute alcohol.

The color of achilleine is instantly destroyed by chlorine; it is not precipitated by tincture of galls nor acetate of lead, but it is thrown down by basic acetate of lead; it is soluble in ammonia, and the solution, when exposed to the air until the ammoniacal odor has disappeared, deposits brown flakes, which are less soluble than achilleine; the slight trace of resin in achilleine may be removed by solution in water.

Achilleic acid is obtained by treating the decoction of Yarrow with acetate of lead as long as any precipitate is formed, this is suspended in water, and decomposed with sulphureted hydrogen. The liquid obtained will be very acid, and contain some lime and green coloring substance; to precipitate the lime, supersaturate it with carbonate of potassa, and then treat it with animal charcoal. The potassa-salt may be precipitated with acetate of lead, and the precipitate decomposed with sulphureted hydrogen.

Achilleic acid is not volatile at 212° F.; its solution can therefore be concentrated by evaporation in the water-bath. The greatest concentration to which it can be brought is 1.014825. In this state it is perfectly colorless, but on further evaporation it becomes straw-colored. Exposed to the air in a glass or porcelain dish, it crystallizes in perfectly colorless quadrilateral prisms. The crystallized acid requires at 56° F. two parts of cold water for solution; the solution is very acid, makes the teeth rough, has no odor, and strongly reddens litmus paper. Added by drops to a clear solution of acetate of lead, it does not render it in the

least turbid; but in a solution of basic acetate of lead it immediately produces a white precipitate, which is very slightly soluble.

Achilleic acid forms salts with carbonates of potassa and soda, ammonia, lime, magnesia, and quinia, which may become useful therapeutical agents. The achilleate of quinia is very soluble, and may be found superior to the sulphate of quinia; it may be made by dissolving quinia in very slightly-diluted acid, allowing the substances to act on each other for several days, stirring them frequently, until the liquid no longer reddens litmus paper. Then filter, and add some alcohol; heat it nearly to boiling, and allow it to cool, when nearly the whole liquid is converted into very beautiful radiate-grouped prismatic crystals, which are very bitter, and readily soluble in water or alcohol.

Properties and Uses.—Yarrow is a tonic, astringent, and alterative. It has been used in intermittent fever, hemoptysis, hematuria, incontinence of urine, diabetes, hemorrhoids, and dysentery; also in leucorrhœa, amenorrhœa, flatulent colic, and some nervous affections. In menorrhœgia, half a fluidounce of the saturated tincture, repeated three or four times daily, has been found advantageous; a few drops of oil of anise will cover its unpleasant taste. The late Prof. T. V. Morrow made much use of an infusion of this herb in dysentery. Dose of the infusion, from four to six fluidounces, three or four times daily; of the volatile oil, from ten to thirty drops.

Achillea Ptarmica or Sneezewort, grows in hedges and thickets, and in moist places in various parts of the country. It is about two feet in height, with the leaves sessile, linear or slightly lanceolate, acuminate, equally and sharply serrate, with appressed teeth, and smooth. The flowers are white, and arranged at the top of the plant in a diffuse corymb. The leaves are remarkably distinct from the Yarrow. The whole plant is pungent, exciting an increased flow of saliva. The powder of the dried leaves when snuffed into the nostrils, produces sneezing, which is supposed to be owing to their small, sharp, and marginal teeth.

ACIDUM ACETICUM.

Acetic Acid.

Preparation.—Take of acetate of soda, in powder, *a pound*; sulphuric acid *half a pound*. Pour the sulphuric acid into a glass retort, and gradually add the acetate of soda; then, by means of a sand-bath, distil the acetic acid with a gentle heat, till the residuum becomes dry. The specific gravity of this acid is 1.0634; and one hundred grains of it saturate 83.5 grains of crystallized bicarbonate of potassa.

Chemical Properties.—The acetic acid of the pharmacopœias is a limpid and colorless liquid, possessing a very sour and acid taste, and a

fragrant, pungent smell. It unites in all proportions with water, and dissolves to a certain extent in alcohol. It possesses the property of dissolving a number of substances, such as the volatile oils, camphor, gluten, resins and gum resins, fibrin, albumen, etc. It is *incompatible* with the alkalies and alkaline earths, both pure and carbonated, with metallic oxides, and most substances acted on by other acids. When well prepared, it should not form a precipitate with the soluble salts of baryta, and should evaporate completely in a glass or platinum capsule, without leaving any residue.

The concentrated acid, or radical vinegar, protohydrated acetic acid, is a colorless, volatile liquid at the temperature of 60°, with a strong acid and corrosive taste, and an acid, pungent, and refreshing smell. Its specific gravity is 1.063. It volatilizes without decomposition, and burns with a blue flame when boiled in open vessels; it attracts humidity from the atmosphere, and should be kept in well-stopped vessels.

Properties and Uses.—Acetic Acid is stimulant, rubefacient, vesicant, and escharotic; and is considerably employed to produce counter-irritation in croup, sore-throat, and other cases of internal inflammation. It may be used by moistening blotting paper or cambric with it, and applying it to the parts to be vesicated. It frequently destroys warts and corns when applied to them, and has been found effectual as an application to scald-head. In syncope, asphyxia, and headache, its vapor is frequently applied to the nostrils as an excitant. It is only used as an external agent. M. Ricord speaks highly of this acid as a local application to venereal ulcers in the primary stage, to be applied as freely as any other caustic, and repeated as often as the condition of the chancres may require. Under its influence the ulcer speedily assumes a healthy aspect and promptly heals. He believes that it neutralizes the venereal poison, and thus obviates all danger of constitutional symptoms. We believe the same may be truly said of other acids, as the nitric, muriatic, tincture of chloride, iron, etc. Half a pint of acetic acid, added to five pints of distilled water; is a valuable substitute for distilled vinegar, in all formulæ requiring nicety.

Off. Prep.—Linimentum Terebinthinæ.

ACIDUM ACETICUM EMPYREUMATICUM. ACIDUM PYROLIGNEUM.

Pyroligneous Acid.

IMPURE ACETIC ACID, OBTAINED FROM WOOD BY DISTILLATION.

History.—Pyroligneous acid is a brown, transparent liquid, having a strong, smoky smell. It consists of acetic acid, with more or less water,

and holding in solution tar and empyreumatic oil. It may be purified by repeated distillation, and then neutralizing it with lime or carbonate of soda.

Properties and Uses.—Stimulant and antiseptic. Used as a local application for arresting or preventing sloughing, for cleansing old sores, abscesses, and burns, scalds, ringworm, tinea capitis, excoriated nipples, etc., and as a gargle in inflamed and ulcerated throat, and scarlatina maligna. Internally, in doses of from ten to thirty drops, it is useful in all cases where an antiseptic is indicated. The pyroligneous tar forms a valuable irritating plaster. Hams or beef, salted, and dipped into the crude pyroligneous acid, and then dried, have the smoky flavor imparted to them, as perfectly as if they were smoked by the ordinary process, and are likewise preserved from “skippers.”

Off. Prep.—Linimentum Terebinthinæ.

ACIDUM BENZOICUM.

Benzoic Acid.

Preparation.—Take of coarsely powdered Benzoin, any quantity. Put the benzoin, previously well mixed with an equal weight of fine sand, into a glass vessel, placed in a sand-bath, and with a heat of 300° gradually increased, sublime until nothing more ascends. Wrap the sublimed matter in bibulous paper, and press it, that it may be separated from the oily part; then again sublime, with a heat not exceeding 400°.

Chemical History.—Benzoic acid is in soft, white, feathery crystals, of a silky luster, and not pulverulent. When pure, it is inodorous, but when prepared by sublimation, it has a peculiar agreeable aromatic odor, which is owing to the presence of an oil. It has a warm, acrid and acidulous taste; is soluble in alcohol, concentrated nitric and sulphuric acids, solution of potassa, and fixed oils. It is a characteristic constituent of the balsams.

Properties and Uses.—Stimulant, and perhaps expectorant. Said by Dr. Ure to convert the uric acid, when in excess, into hippuric acid. Used in the phosphatic form of gravel; also in gout and rheumatism, combined with carbonate of potassa. Used externally in some cutaneous diseases, and enters into some cosmetic washes. Dose, 10 to 30 grains.

Off. Prep.—Tinctura Opii Camphorata. Unguentum Sulphuris Compositum.

ACIDUM CHROMICUM.

Chromic Acid.

Preparation.—To one volume of a cold saturated solution of bichromate of potassa add one volume and a half of pure sulphuric acid, and allow the mixture to cool in a covered capsule, or in a flask, when it deposits beautiful deep-red needles of chromic acid. The liquid being drained off, these are laid on a porous brick to dry, covered with a glass bell-jar. They must be preserved in very tightly-stoppered vials.

Chemical Properties.—Chromic Acid is a strong acid, isomorphous with sulphuric, selenic, and manganic acids. It is very soluble in water, and is highly deliquescent in the air. It destroys the color of indigo, and of most vegetable and animal coloring matters. It is a powerful oxidizing agent, yielding half its oxygen readily to oxidizable bodies, and being reduced to sesquioxide.

Properties and Uses.—Recommended in the treatment of piles; the acid is to be applied freely over the whole of the diseased surface, and when properly managed it will not spread beyond the prescribed limits. It occasions uneasiness for some hours, and sometimes acute burning pain—a slough passes away, and the tumor shrinks and becomes insensible. As soon as its erosive operation is finished, the acid passes into a state of inert pulverulent sesquioxide. It may likewise be found advantageous in cancer, malignant tumors, ulcers, etc.

The Bichromate of Potassa in saturated solution has been recommended as a local application to warts, excrescences, and tubercular elevations; it causes but little pain, and often removes these growths by absorption without any slough; or if a slough has formed, it serves to expedite the cure, and is not followed by deep, unmanageable ulcers.

When this salt is applied in solution to the skin, habitually, it first produces an eruption of papulæ, which become pustular, and, provided the exposure be continued, form deep sloughs under the pustules, of a peculiarly penetrating character.

A green ink may be made by dissolving 180 grains of bichromate of potassa in one fluidounce of water; add to the solution while warm, half a fluidounce of spirit of wine, then decompose the mixture with strong sulphuric acid until it assumes a brown color. Evaporate the liquor to one-half, let it cool, dilute it with two fluidounces of distilled water and filter it, then add half a fluidounce of spirit of wine, and a few drops of strong sulphuric acid, and let it stand. After some time the ink assumes a beautiful green color, and is rendered fit for use by the addition of a small quantity of Gum Arabic.

A very cheap ink, costing about two or three cents a gallon, may be made by neutralizing a solution of bichromate of potassa with salt of

tartar, (or until effervescence ceases). Then add a sufficient quantity of this to an infusion of logwood, to give it the desired color. This ink, however, is apt to fade, and precipitates from the slightest causes; the smallest proportion of common black ink will cause a precipitate. To render the above ink perfectly permanent, and of a more intense black color, add to it a few drops of a solution of corrosive sublimate.

ACIDUM CITRICUM.

Citric Acid.

Preparation.—Citric Acid is present in the juices of many fruits, but it is principally obtained from lemon or lime-juice, which is saturated with prepared chalk, the precipitated citrate of lime is repeatedly washed, and then decomposed with a slight excess of dilute sulphuric acid; then strained, carefully concentrated by boiling, and crystallized.

Chemical Properties.—Citric acid is a white crystallized solid, often in large crystals, having the form of rhomboidal prisms with dihedral summits. It is permanent in dry air. Specific gravity, 1.6. Its taste is strongly acid, and almost caustic. It dissolves in three-fourths of its weight of cold, and half its weight of boiling water. A weak solution has an agreeable taste, but soon undergoes spontaneous decomposition. It is also soluble in alcohol.

Properties and Uses.—Citric acid is refrigerant and antiscorbutic. It may be used in fevers, in the form of lemonade, made by dissolving the acid in water, sweetening sufficiently, and adding a few drops of essence of lemon; it is likewise beneficial in scurvy, acidity of the stomach, and some peculiar forms of sick-headache. A mixture for making good lemonade, and which will keep for years if preserved dry, is to combine together, one and a half ounces of powdered citric acid, one pound of powdered white sugar, and five drops of oil of lemon. A teaspoonful of this to a pint of water, forms an agreeable and beneficial draught for patients with febrile diseases, especially when the tongue is coated brown or black.

ACIDUM GALLICUM.

Gallic Acid.

Preparation.—Take of Galls in powder, three pounds; distilled water, purified animal charcoal, of each a sufficient quantity. Mix the galls with sufficient distilled water to form a thin paste, and expose the mixture to the air, in a shallow glass or porcelain vessel, in a warm

place, for a month, occasionally stirring it with a glass rod, and adding from time to time sufficient distilled water to preserve the semi-fluid consistence. Then submit the paste to expression, and rejecting the expressed liquor, boil the residue in a gallon of distilled water for a few minutes, and filter while hot through animal charcoal. Set the hot liquor aside that crystals may form, which may be dried on bibulous paper. If the crystals be not sufficiently free from color, they may be purified by dissolving them in boiling distilled water, filtering through a fresh portion of animal charcoal, and crystallizing.

This is the process recommended by the U. S. Pharmacopœia, and is based upon the fact, that galls in decoction or moistened, and exposed to the air, gradually have their tannic acid converted into gallic acid, oxygen being absorbed, with the escape of an equivalent amount of carbonic acid. The smallest quantity of sesquioxide of iron, will prevent the bleaching of the acid, so that the animal charcoal should be purified, and the filtering-paper examined. As the first crop of crystals obtained by the above method, retains a large quantity of water, they should be subjected to strong expression between two folds of bibulous paper.

Mr. C. Wetherill, upon the belief that gallic acid differs from tannic, wholly in containing water, endeavored to prepare the former from the latter, by the fixation of the water, and succeeded by means of sulphuric acid. He mixed thirteen drachms of tannic acid with twenty-two fluid ounces of sulphuric acid and four times that bulk of water, and heated the mixture to the boiling point, and then allowed it to stand. In a few days an abundant precipitate of white gallic acid took place, amounting to 87.4 per cent. of the tannic acid.

History.—Gallic acid is in delicate, silky, acicular crystals, slightly brownish, but colorless when pure. It is inodorous, and of a sourish astringent taste. It is soluble in 100 parts of cold water, and 3 of boiling water, very soluble in alcohol, and only slightly so in ether. On exposure to the air it undergoes spontaneous decomposition. Heated to 420° , it gives out carbonic acid, and is converted into *pyro-gallic acid*; thrown on red-hot iron, it is entirely dissipated. It does not precipitate gelatin like tannic acid, nor a solution of sulphate of protoxide of iron, but occasions a deep bluish-black precipitate with a solution of the salts of sesquioxide of iron. Its formula is $C_7 H_3 O_5$, and its combining number 85.

Properties and Uses.—Gallic acid is a valuable astringent, and is used principally as an internal astringent. As such it has been found beneficial in hemorrhages from the kidneys, uterus, and lungs. Menorrhagia has promptly ceased under its use. It is also useful in chronic mucous discharges from the bowels or bladder, and has some reputation in arresting the excretion of albumen in Bright's disease of the Kidney.

It is believed to be more efficient than tannic acid, in cases of hæmorrhage, where the bleeding vessels must be reached through the circulation, as its chemical affinities do not afford the same impediment to its absorption as those of the tannic acid. It is said not to constipate. Dose of gallic acid, is from five to fifteen grains, three or four times a day, in the form of pill or powder.

Off. Prep.—Liquor Potassæ Citratis; Ferri et Quiniæ Citras; Ferri Citras; Quiniæ Citras.

ACIDUM HYDRIODICUM.

Hydriodic Acid.

Preparation.—Take of iodide of potassium 330 grains, tartaric acid 264 grains. Dissolve these salts, separately, each in a fluidounce and a half of distilled water, and mix the solutions. Filter the liquor, in order to separate the bitartrate of potassa which precipitates, and add to it sufficient distilled water to make the whole measure fifty fluidrachms.

History.—This solution is sufficiently pure for medicinal use, although it contains a little cream of tartar; each fluidrachm of it contains five grains of iodine. At first it is limpid, or has only a slight yellow tinge, but becomes a wine-yellow on keeping, and finally a beautiful red, in consequence of the disengagement of iodine.

Properties and Uses.—Hydriodic Acid is supposed to possess all the virtues of iodine, without any of its irritant properties, and may be employed in all cases where iodine is indicated. The dose is five drops gradually increased to a fluidrachm, and repeated two or three times a day. It should be sufficiently diluted with water, when given, to reduce it to an agreeable acidity. Hydriodic acid has been combined with several of the new organic alkalies, for the purpose of forming new medicinal agents.

ACIDUM HYDROCHLORICUM.

Muriatic Acid. Spirit of Sea Salt.

Preparation.—Hydrochloric Acid is prepared from muriate of soda, by the decomposing power of sulphuric acid, which liberates the acid in the form of gas; and this passing into vessels containing water, is readily absorbed by that fluid.

Chemical Properties.—When pure, hydrochloric acid is a transparent, colorless liquid, of a corrosive taste and suffocating odor. The yellow tinge often seen in the medicinal acid is owing to the presence of iron, or some organic matter. Its specific gravity is 1.21; that of the medi-

cinal acid is 1.16. It is *incompatible* with alkalis and most earths, with oxides and their carbonates, and with sulphuret of potassium, tartrate of potassa, tartar emetic, tartarized iron, nitrate of silver, and solution of subacetate of lead.

Properties and Uses.—Diluted hydrochloric acid is tonic, refrigerant, and antiseptic. Used in fevers, some forms of syphilis, and to counteract phosphatic deposits in urine. It has also been beneficial in malignant cases of typhus and scarlatina, given in a strong infusion of quassia. Likewise said to prevent the formation of worms. It is also valuable as a gargle in various ulcers of the mouth and throat, and elongated uvula. The dose is five to twenty drops, in a wineglassful of water; it ought to be sucked through a quill or glass tube, to prevent its injuring the teeth. The dilute acid is made by adding four ounces of pure acid to twelve ounces of water.

It is sometimes used, in the concentrated form, as an application to cancrum oris, some obstinate ulcers of the tongue, in certain syphilitic and mercurio-syphilitic diseases, and in phagedenic ulceration; also, in chilblains or frost-bites.

When swallowed internally, in its pure state, magnesia, chalk, or soap dissolved in water, are the antidotes, together with the free use of bland and mucilaginous drinks.

Off. Prep.—Acidum Nitro-muriaticum; Acidum Muriaticum Dilutum; Calcii Chloridum; Morphia Murias; Quiniæ Murias; Tinctura Ferri Chloridi; Unguentum Acidi Muriatici; Potassii Cyanuretum.

ACIDUM HYDROCYANICUM.

Hydrocyanic Acid. Prussic Acid. Cyano-hydric Acid.

Preparation.—Take of sulphuric acid, *one and a half ounces*; water *four fluidounces*; mix, and when cool, put them into a tubulated glass retort, and add ferrocyanuret of potassium, *two ounces*, dissolved in distilled water, *ten fluidounces*. Pour *eight fluidounces* of distilled water into a cooled receiver, and having attached this to the retort, distil *six fluidounces* with a gentle heat. Lastly, add to this product five fluidounces of distilled water, or a sufficient quantity, so, that 12.7 grs. of nitrate of silver, dissolved in water, may be accurately saturated by 100 grs. of the acid, indicating two per cent. of real acid.

Hydrocyanic Acid, when wanted for immediate use, may be prepared as follows: Add together one fluidounce of distilled water, forty-one grs. of muriatic acid, and fifty and a half grs. of cyanuret of silver; shake the mixture in a stopped vial, and when the precipitate has subsided, pour off the clear liquid. The acid should always be kept in a cool, dark place, and in closely stopped vials.

Chemical History.—The dilute, or medicinal hydrocyanic acid, is a transparent, colorless, volatile liquid, possessing a taste at first cooling, afterward somewhat irritating, and a peculiar smell. By exposure to light, it undergoes decomposition, and the bottles containing it should be covered with black paint or dark paper. Its constituents are carbon, nitrogen and hydrogen.

Properties and Uses.—Hydrocyanic acid is the most deadly poison known, but is employed in medicine as a sedative and antispasmodic. It has been recommended in asthma, pertussis, spasmodic coughs, hypertrophy of the heart, neuralgia of stomach and bowels, and dyspepsia, connected with morbid irritability of the stomach. Locally, it has been used in some cutaneous diseases, to allay the itching. Dose, half, to one drop, in gum-water or syrup. Much care must be used in its administration. Five drops have been safely given, by carefully and gradually increasing the dose.

In cases where large doses do not prove immediately fatal, the antidotes most to be relied upon, are chlorine, diluted ammonia, cold affusion, and artificial respiration.

ACIDUM LACTICUM.

Lactic Acid.

Preparation.—To six pints of milk, add eight ounces of bicarbonate of soda. Expose it to the air for some days, till it becomes sour, and saturate it with more soda. Repeat this as often as it becomes acid. Boil, filter, and evaporate to the consistence of syrup, and digest with alcohol. Filter the solution, and add sulphuric acid as long as it occasions a precipitate. Again filter, and concentrate the clear solution by evaporation, till its density is 1.215.

Another mode of preparing this acid is, according to A. Beusch, to dissolve cane-sugar six pounds, and tartaric acid half an ounce, in boiling water twenty-six pounds, and set it aside for some days; upon this, old stinking cheese eight ounces, well diffused in curdled acid milk from which the cream has been removed, are to be added to the above mixture along with finely-powdered chalk three pounds, the whole to be kept in a warm place, so that the temperature of the liquor shall be from 86° to 95°. It must be well stirred several times every day; in the course of from eight to ten days the entire mass will solidify to a stiff paste of lactate of lime; to this paste are to be added, boiling water twenty pounds, and caustic lime half an ounce, then boil for half an hour, and filter through a linen bag. The liquid is then to be evaporated to the consistency of a syrup, and set aside for four days, in which time the lactate of lime will separate in a granular crystalline form; it

must then be expressed, agitated with one-tenth its weight of cold water, again submitted to pressure, and this operation to be repeated two or three times.

The lactate of lime, after being expressed as well as possible, is dissolved in twice its weight of boiling water; and for every pound of expressed lactate of lime, three and a half ounces of sulphuric acid previously diluted with its weight of water, must be added to the solution. The hot liquid is to be immediately filtered from the precipitated gypsum, through a conical bag, and then boiled with carbonate of zinc one and three-eighth pounds for every pound of sulphuric acid which has been used; it must not be boiled longer than a quarter of an hour, if over this time, a very insoluble basic salt is formed. The solution, filtered boiling hot, soon deposits perfectly colorless lactate of zinc in crystalline crusts, which may be obtained perfectly free from sulphuric acid by rinsing with cold water. The mother-ley is to be again boiled with any of the salt which may have remained on the strainer, or concentrated by evaporation. It yields nearly to the last drop, perfectly white lactate of zinc.

To separate the lactic acid from this salt, dissolve it in seven and one-half parts of boiling water, pass a current of sulphureted hydrogen into the hot liquid until it has become cold and no further separation of sulphuret of zinc can be perceived. The liquid filtered from the sulphuret of zinc is to be boiled to expel the excess of sulphureted hydrogen, and then evaporated in a water-bath to the consistence of a syrup. Eight parts of lactate of zinc yield, in this manner, five parts of perfectly pure lactic acid.

The separation of the lactic acid may likewise be accomplished by adding barytic water, which produces lactate of baryta, and precipitates the oxide of zinc; the addition of sulphuric acid removes the baryta, and the filtered liquid is pure diluted lactic acid, which must be concentrated by evaporation, in vacuo.

The acid of sour crout is lactic acid, and by boiling it with carbonate of zinc, lactate of zinc may be obtained.

Chemical Properties.—Hydrated lactic acid is a syrupy liquid, of a very strong but pleasant acid taste; its specific gravity is 1.215. At 482° the hydrate is decomposed and yields a solid crystalline sublimate called anhydrous, or sublimed lactic acid, *lactide*, which readily dissolves in hot water, and if the solution be evaporated yields the original hydrate. The hydrated acid is inodorous, attracts moisture when exposed to the air, and is dissolved in all proportions by water or alcohol. It quickly dissolves oxalate of lime, and phosphate of lime, especially that which is contained in the bones, and hence has been recommended in oxalic and phosphatic urinary deposits. It is not employed in medicine in its uncombined state, but is used in the preparation of Lactate of

Iron, and Lactate of Quinia. Albumen is coagulated by it. The formula of the hydrated acid is $C_6H_5O_5 + HC$. Magendie has proposed it as a remedy in certain forms of dyspepsia, and for the removal of phosphatic deposits in the urine. It may be taken in doses of from one to three drachms in the course of the day, and is best given in solution, sweetened with sugar.

ACIDUM NITRICUM.

Nitric Acid. Aqua Fortis.

Preparation.—Nitric Acid is made from nitrate of potassa, by the agency of sulphuric acid—sulphate of potassa being formed, and nitric acid liberated in the form of gas. The acid gas is passed into a vessel of water, which absorbs it, and acquires acid properties.

Chemical History.—The pure acid is transparent and colorless, and emits gray fumes of an irritating, peculiar odor, and has an intensely acid, corrosive taste. It stains the skin yellow, and corrodes and dissolves all soft animal textures. The strongest acid has a specific gravity of 1.5; the ordinary acid of commerce, 1.3. It changes morphia to a red or yellow color, and is itself changed to a blood-red by the addition of brucia. Exposure of the acid to light, changes it more or less; and when left open to the air, it absorbs moisture and becomes weakened.

When the acid is of a straw color, it is owing to the presence of nitrous acid. Most animal and vegetable bodies are converted into malic, carbonic, or oxalic acids, by the action of nitric acid diluted. This acid acidifies sulphur and phosphorus, and oxidizes all metals, except gold, platinum, iridium, chromium, osmium, rhodium, cerium, columbium, and titanium; but when mixed with muriatic acid, a mutual decomposition takes place, and aqua regia or nitro-muriatic acid is formed, which is capable of dissolving gold.

Nitric acid is often rendered impure by the presence of sulphuric acid, or chlorine; a few drops of the solution of chloride of barium to the nitric acid, diluted with three or four parts of distilled water, will produce a cloud, if sulphuric acid be present; and a similar application of a few drops of a solution of nitrate of silver, will produce a cloud if chlorine be present. The acid of commerce sometimes contains iodine, which may be detected by saturating the suspected acid with a carbonated alkali, then pouring in a little clear solution of starch, and finally, adding a few drops of sulphuric acid. If iodine be present, the sulphuric acid will set it free, and the starch solution will become blue.

When nitric acid is added to a solution of glue, it prevents it from forming a jelly, and makes what is called a "liquid glue," which is very

convenient for cabinet-makers, joiners, pasteboard-workers, toy-makers, etc., inasmuch as it is applied cold. This liquid glue is made by taking two and one-fifth pounds of good glue, and dissolving it in two and one-ninth pints of water, in a glazed pot over a gentle fire, or still better, in the water-bath, stirring it from time to time. When all the glue is melted, pour in, in small quantities at a time, of nitric acid specific gravity 1.32, seven ounces avoirdupois. This addition produces an effervescence, owing to the disengagement of hypo-nitrous acid. When all the acid is added, remove the vessel from the fire, and allow it to cool. This preparation preserves nearly all the primitive qualities of the glue, may be kept in an open vessel for years, without undergoing any change, and will be found very convenient in chemical operations; gases may be preserved by it, by covering strips of linen with it.

Properties and Uses.—Escharotic, epispastic, tonic, refrigerant, expectorant, antiseptic, and syphilitic. Largely diluted with water, it forms a good acid drink in febrile diseases, especially where there is a disposition to prostration or putrescency. It has also been serviceable in some forms of syphilis and chronic hepatitis. Externally it has been applied, in a dilute form, say twelve or fifteen minims to the pint of water, to ulcers of an indolent or phagedenic character, and in various chronic eruptions, porrigo of the scalp, etc.; and has likewise been used for destroying warts, and cauterizing poisoned wounds.

In the treatment of piles, nitric acid, is said to be very efficacious; the small tumors may be destroyed by a single application of it, while the larger may require two or three applications. If the tumors cannot be extruded from the anus, a speculum must be used. The acid may be applied by a bit of sponge not larger than a grain of wheat, attached to a gold or glass probe. The severe pain which usually follows may be relieved by morphine exhibited internally, and lard, or opiate suppositories applied locally. If too much acid has been applied, extending to contiguous parts, and causing unnecessary pain, it may be neutralized by applying a piece of sponge or cotton, saturated with soda or potassa. Dr. Dixon expresses a hope, grounded on the successful results of its application, that all cases of piles may thus be cured, with greater certainty than by excision or ligation.

For several years past I have used nitric acid as a local application to chancre in hundreds of instances, and have not yet heard of any return of the disease, either in a secondary or tertiary form. It must be applied while the chancre is in the pustular form, and unbroken, and before the virus is acted upon by the oxygen of the atmosphere, and consequently, previous to its absorption in the system. As soon as the pustule is discovered, the physician will open it, and apply several drops of undiluted nitric acid to it, thus destroying the virus at once, and curing the disease in a few minutes. The pain occasioned is hardly

noticed by some patients. Sometimes, I subsequently wash the ulcer with the muriated tincture of iron, which is one of the best local applications to a chancre with which I am acquainted. No other treatment is required, unless for the purpose of allaying the patient's fears. Since having introduced this employment of the acid to the profession, many have employed it, and uniformly with successful results.

The dose of nitric acid is from five to twenty minims, given two or three times a day; the diluted acid, which is the most convenient for prescription, may be made by adding one fluidounce of nitric acid to nine fluidounces of distilled water. The dose of which is from twenty to forty drops, in two or three fluidounces of water.

When swallowed internally, without dilution, nitric acid almost always proves fatal; the same means may be employed to counteract its effects as named for hydrochloric acid.

Off. Prep.—Acidum Nitro-muriaticum; Acidum Nitricum Dilutum; Spiritus Ætheris Nitrici; Unguentum Acidi Nitrici.

ACIDUM NITROHYDROCHLORICUM.

Nitrohydrochloric Acid.

NITROMURIATIC ACID. AQUA REGIA.

Preparation.—The usual form for preparing this acid is to combine one part, by measure, of nitric acid, with two parts of hydrochloric acid; but as I introduce it here merely because it enters into the formula for the *White Liquid Physic*, given below, I will state that in this instance it should be made of *equal parts* of nitric and muriatic acids.

This acid promptly dissolves gold, and as it readily parts with its chlorine, it, together with its preparations, should always be preserved in close bottles.

Properties and Uses.—Similar to the above mineral acids. Bathing with a dilute solution of this acid, say one part of acid to six of water, is asserted to have cured several cases of obstinate constipation. Dose, three or four drops, sufficiently diluted.

A preparation has been highly recommended, called *White Liquid Physic*, or *Dow's Physic*. It is made as follows: Take sulphate of soda, *half a pound*; water, *one and a half pints*; dissolve, and then add, nitromuriatic acid, *two fluidounces*, powdered alum, *one drachm and eight grains*.

This preparation is used as a cooling purgative, also to allay nausea and vomiting—for colic, hepatic diseases, diarrhea, etc. Given by some as a substitute for mercury. In intermittent fever, given in laxative doses, it has proved highly beneficial, especially when occurring in

broken-down constitutions, and has cured the most obstinate cases of dysentery. Dose, one tablespoonful in a gill of water, three times a day—or, in dysentery, given every hour, until it slightly operates on the bowels, after which, every three or four hours. The above is the original recipe, and the additions of sanguinaria, etc., are uncalled for.

A preparation which is highly recommended for the cure of corns, warts, cancers, etc., Dr. Bleeker's remedy, is said to be a compound of nitro-muriatic acid and cobalt.

ACIDUM OXALICUM.

Oxalic Acid.

History.—Oxalic Acid is found in animals and in vegetables; it is formed sometimes during abnormal conditions of the kidneys, and is deposited in the bladder as oxalate of lime, giving rise to the mulberry calculus. It is also found combined with potassa in the common sorrel, and wood-sorrel, and united with lime in the roots of rhubarb, valerian, and other plants.

Preparation.—It is usually obtained by the decomposition of sugar with nitric acid. Four parts of sugar are acted upon by twenty-four parts of nitric acid of specific gravity 1.22, and the mixture is heated so long as any nitric oxide is disengaged. A part of the carbon of the sugar is converted into carbonic acid, by oxygen derived from the nitric acid, which is thereby partially converted into nitric oxide. The undecomposed nitric acid, reacting on the remaining elements of the sugar, generates oxalic and malic acids, the former of which crystallizes as the materials cool, while the latter remains in solution. The crystals being removed, a fresh crop may be obtained by further evaporation. The thick mother-water which now remains is a mixture of malic, nitric, and oxalic acids; and by treatment with six times its weight of nitric acid, the greater part of the malic acid will be converted into oxalic acid. The new crop of crystals, however, will have a yellow color, and contain a portion of nitric acid, the greater part of which may be got rid of by allowing them to effloresce in a warm place.

Many substances beside sugar yield oxalic, by the action of nitric acid; as for example, starch, gum, wool, hair, silk, and many vegetable acids. In every case in which it is thus generated, the proportional excess of oxygen which it contains, compared with every other organic compound, is furnished by the nitric acid. Organic substances yield oxalic acid also, when heated with potassa. Thus shavings of wood, if mixed with a solution of caustic potassa, and exposed to a heat considerably higher than 212° , will be partially decomposed and converted into oxalic acid, which then combines with the alkali. This process constitutes, perhaps, the cheapest method of obtaining oxalic acid.

**USES FOR
SAWDUST.**

Many uses have been proposed for sawdust, but one of the purposes to which considerable sawdust of the United States is devoted is the manufacture of oxalic acid. A number of patent processes for the production of this acid from sawdust or similar by-products now exists. Several of these plants have been started in various parts of the country. The sawdust is treated with strong soda or potash lyes and exposed to the action of air at certain temperatures. The wood fibre is destroyed and certain reactions take place between the lignine and the lyes, which result in the formation of oxalic acid. The final product is leached with water and the oxalic acid crystallised out.—M. Dawson.

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Chemical Properties.—Oxalic acid is a colorless crystallized solid, possessing considerable volatility, and a strong sour taste. Its crystals have the shape of slender, flattened, four or six-sided prisms, with two-sided summits; and, when exposed to a very dry atmosphere, undergo a slight efflorescence. It dissolves in about nine times its weight of cold, and in about its own weight of boiling water. The solution of the crystals takes place with slight crepitation. It dissolves also, but not to the same extent, in alcohol. The presence of nitric acid renders it more soluble in water. It combines with salifiable bases, and forms salts called oxalates. The most interesting of these are the three oxalates of potassa, severally called oxalate, binoxalate, and quadroxalate, and the oxalate of lime. The binoxalate of potassa or *salt of sorrel*, sometimes improperly called the *essential salt of lemons*, is employed for removing iron-molds from linen, and acts by its excess of acid which forms a soluble salt with the sesquioxide of iron constituting the stain. Oxalic acid is used for removing ink stains and iron-molds, for cleaning the leather of boot-tops, and for discharging colors in calico-printing.

Properties and Uses.—This article is a poison, and an unfit agent for internal administration. Externally, a saturated aqueous solution of it is useful in cutaneous cancer, acne, and several forms of cutaneous disease. The saturated solution neutralized by caustic potassa, forms an excellent application to discuss indolent tumors.

In cases, where this article has been taken internally, it has produced death in a short time. The antidotes are chalk or magnesia, mixed with water, and followed by emetics.

ACIDUM PHOSPHORICUM DILUTUM.

Diluted Phosphoric Acid.

Preparation.—Take of Phosphorus, *an ounce*; Nitric acid *four fluidounces*; Distilled Water *ten fluidounces*, (imperial measure). Add the phosphorus to the nitric acid, mixed with the water in a glass retort placed in a sand-bath; then apply heat until eight fluidounces are distilled. Put these again into the retort, that eight fluidounces may distil, which are to be rejected. Evaporate the remaining liquor in a platinum capsule until only two ounces and six drachms remain. Lastly, add to the acid, when it is cold, as much distilled water as may be sufficient to make it accurately measure twenty-eight fluidounces. The specific gravity of this acid is 1.064. One hundred grains of it saturate forty-two grains of carbonate of soda.

Chemical Properties.—Diluted Phosphoric Acid is a colorless, inodorous, sour liquid, acting strongly on litmus and possessing powerful acid

properties. If it be saturated by ammonia, nitrate of silver occasions a yellow precipitate of phosphate of silver. Arsenious acid is the only acid similarly acted on; and it may be determined from phosphoric acid by the action of sulphureted hydrogen, which causes a yellow precipitate with the arsenious acid, while it has no effect at all upon the phosphoric. When concentrated till the temperature attains 300° , diluted phosphoric acid acquires its greatest state of concentration, and presents the appearance of a brown oily liquid, which consists of one equivalent of acid, and three of water. Although evaporated so as to become dense, it does not act upon animal and vegetable matter like sulphuric acid. The acid may be obtained in crystals, by evaporating the brown oily liquid, mentioned above, in vacuo. From its saturating power, diluted phosphoric acid is shown to contain 10.5 per cent. of real phosphoric acid. If the brown oily liquid be deprived of its water by a long continued heat of 415° , one equivalent of its water is disengaged, and the acid acquires new properties, and a yellow precipitate will no longer be occasioned by nitrate of silver. When the diluted acid is evaporated to dryness, and heated to redness, it becomes a transparent, white, brittle, fusible solid, formerly named *Glacial Phosphoric Acid*, but now termed *Metaphosphoric Acid*.

Properties and Uses.—Diluted phosphoric acid is tonic and refrigerant, and is asserted to prevent the morbid secretion of bony matter, correct urinary phosphatic deposits and to allay pain and spasm. It has likewise been recommended in hysteria, diabetes, and leucorrhea. It is very useful in cases of impotency from masturbation, to improve the condition of the sexual organs. Externally, it has been applied to tedious and obstinate ulcers. Dose, from ten to thirty drops, two or three times a day, diluted with a few ounces of water.

Off. Prep.—Ammoniæ Phosphas; Ferri Phosphas; Sodæ Phosphas.

ACIDUM SULPHURICUM AROMATICUM.

Aromatic Sulphuric Acid. Elixir of Vitriol.

Preparation.—Take of Sulphuric Acid, *three fluidounces and a half*; Ginger, bruised, *an ounce*; Cinnamon, bruised, *an ounce and a half*; Alcohol, *two pints*; drop the Acid gradually into the Alcohol, and digest, in a close vessel, for three days; then add the Ginger and Cinnamon, and macerate for a week; lastly, filter through paper.—*U. S. P.*

History.—This is a reddish-brown liquid, of a peculiar aromatic odor, and when sufficiently diluted, of a grateful acid taste. It consists of sulphuric acid diluted with alcohol, and containing the essential oils of Cinnamon and Ginger.

Properties and Uses.—It possesses the same properties as sulphuric acid, for which it is generally substituted in this country. The dose is from ten to thirty drops in sweetened water; care must be taken that it does not injure the teeth.

ACIDUM SULPHURICUM DILUTUM.

Diluted Sulphuric Acid. Oil of Vitriol.

Preparation.—Take of sulphuric acid, *one fluidounce*; distilled water, *thirteen fluidounces*. Gradually add the acid to the water, in a glass vessel, and mix them. The specific gravity of this acid is 1.09.

History.—Sulphuric Acid is obtained by burning sulphur, mixed with one-eighth its weight of nitre, over a stratum of water, contained in a chamber lined with sheet-lead. It is a dense, colorless, inodorous liquid, of an oleaginous appearance, and possessing strong corrosive qualities. When pure its sp. gr. is 1.845. It acts powerfully on organic bodies, whether animal or vegetable, depriving them of the elements of water, developing charcoal, and turning them black. On the living fiber it acts as a powerful caustic. The density of the commercial acid varies between 1.835 and 1.840 or upward. If greater than 1.845, it indicates an unusual amount of impurity. It freezes about 36° below zero, and boils a little above 600°. It has a powerful affinity for water, so as to attract it quickly from the atmosphere, and also from many other bodies through the medium of the atmosphere, if confined together in a circumscribed place. It unites with water in all proportions, with some condensation of volume, and the evolution of much heat, which is apt to crack glass vessels, which may be avoided by adding the acid gradually.

Properties and Uses.—Diluted Sulphuric Acid is tonic, refrigerant, and astringent. It has been used in low typhoid fevers, and in convalescence from protracted fevers, as a tonic. As an astringent, it has been employed in colliquative sweats, passive hemorrhages, and diarrhea. Likewise used in phosphatic calculous affections. Externally, employed in gargles for ulcerated sore-throat, to check excessive ptyalism, and as a wash for cutaneous eruptions, and ill-conditioned ulcers. Dose, from ten to thirty drops, three times a day, in a wineglassful of plain or sweetened water. To preserve the teeth, it were better to suck it through a quill or glass tube.

Off. Prep.—Acidum Sulphuricum Aromaticum; Acidum Sulphuricum Dilutum; Ferri Sulphas; Linimentum Nigrum; Morphiae Sulphas; Quiniae Sulphas; Unguentum Acidi Sulphurici; Zinci Sulphas.

ACIDUM TANNICUM.

Tannic Acid. Tannin.

Preparation.—Cause sulphuric ether to percolate through any quantity of powdered galls, in a glass adapter, having the lower end loosely closed with carded cotton. The liquor obtained in the receiver separates into two parts, and the ether must be allowed to percolate through the galls until the lower stratum of liquid in the receiver no longer increases. Pour off the upper layer, and evaporate the lower portion with a moderate heat, to dryness.

M. Sandrock states that a much larger quantity of Tannic Acid may be obtained by employing a mixture of sixteen parts of ether and one part of alcohol. The percolated liquid separates into two layers. The lower one contains the tannic acid, which may be obtained perfectly pure on evaporation; the upper layer contains the gallic acid, coloring matter, and some tannic acid. The tannic acid in the upper layer may be had by evaporating the liquid to dryness, treating the residue with pure ether, until the lower of the two layers into which the liquid separates, no longer presents a green color; and then separating it, adding if necessary a little alcohol, and evaporating.

Chemical Properties.—Pure Tannic Acid is solid, uncrystallizable, white, or very slightly yellowish, inodorous, strongly astringent to the taste, without bitterness, very soluble in water, much less soluble in alcohol and ether, especially when anhydrous, and insoluble in the fixed and volatile oils. It may be kept unchanged in the solid state. Exposed to heat, it partly melts, swells up, blackens, takes fire, and burns with a brilliant flame. The aqueous solution, when exposed to the air, gradually becomes turbid, and deposits a crystalline matter, consisting chiefly of gallic acid. During the change, oxygen is absorbed, and an equal volume of carbonic acid disengaged. Tannic acid has an affinity for acids, and when in solution affords precipitates with the sulphuric, nitric, muriatic, phosphoric, and arsenic acids, but not with the oxalic, tartaric, lactic, acetic, or citric. The precipitates are compounds of tannic acid with the respective acids, and are soluble in pure water, but insoluble in water with an excess of acid. Hence, in order to insure precipitation, it is necessary to add the acid in excess to the solution of tannic acid. This principle also unites with most of the salifiable bases. With potassa, it forms a compound but slightly soluble, and is therefore precipitated by this alkali, or its carbonates, from a solution which is not too dilute, though a certain excess of alkali will cause the precipitate to be re-dissolved. Its combination with soda is much more soluble, and this alkali affords no precipitate, unless with a very concentrated solution of tannic acid. With ammonia, its relations are similar to those with potassa. Many of the

metallic salts are precipitated by tannic acid even in the uncombined state, especially those of lead, copper, silver, uranium, chromium, mercury, and the protosalts of tin. With the sesquisalts of iron it forms a black precipitate, which is a compound of tannic acid and the sesquioxide of iron, and is the basis of ink. It does not disturb the solutions of the pure protosalts of iron. Several of the alkaline salts precipitate tannic acid from its aqueous solution, either by the formation of insoluble compounds, or by simply extracting the solvent. Tannic acid unites with all the vegetable alkalies, forming compounds which are for the most part of a whitish color, and but very slightly soluble in water, though they are soluble in the vegetable acids and in alcohol, and in this latter respect differ from most of the compounds which tannic acid forms with other vegetable principles. On account of this property of tannic acid, it has been employed as a test of the vegetable alkalies; and it is so delicate that it will throw down a precipitate from their solution even when they are too feeble to be disturbed by ammonia. It precipitates also solutions of starch, albumen, and gluten, and forms with gelatin an insoluble compound, which is the basis of leather. Its ultimate constituents are carbon, hydrogen, and oxygen.—*U. S. Disp.*

Properties and Uses.—A pure astringent. Used in chronic dysentery and diarrhea, and in uterine and other passive hemorrhages, and as a wash or injection to remove chronic mucous discharges, as in bronchial catarrh, gonorrhea, gleet, leucorrhea, etc. It has likewise been recommended in diabetes, combined with opium, and to arrest excessive perspiration — also in conjunction with morphia, in Asiatic Cholera. Externally, it has been successfully used in excoriation, prolapsus ani, piles, fissure of the anus or rectum, sore nipples, phagedenic ulcers, aphthous ulceration of the mouth, sore-throat, severe salivation, and in tooth-aches, in solution with ether. It may be employed in form of a wash, by adding five grains to a fluidounce of water; or in ointment, one part of the acid to fifteen of lard. It is a valuable remedy, the only disadvantage being its tendency to produce constipation, which may be avoided by the addition of a small quantity of podophyllin, in cases where this resin is not contra-indicated.

Tannic acid should not be given during the presence of active inflammation. Several cases of cholera in the collapsed stage, have been cured by Prof. R. S. Newton, by doses of ten or fifteen grains of Tannic Acid, repeated every ten or fifteen minutes, until the discharges ceased; and continuing it afterward at longer intervals, with other appropriate treatment. The Geraniin is now usually preferred by Eclectic practitioners to the Tannic acid, as it does not leave the tissues upon which it acts so harsh and dry, as is the case with the latter agent. Dose of Tannic acid, from half a grain to five grains.

Off. Prep.—*Ferri Tannas*; *Quiniæ Tannas*.

ACIDUM TARTARICUM.

Tartaric Acid.

Preparation.—Saturate the excess of acid in bitartrate of potassa with carbonate of lime; decompose the resulting insoluble tartrate of lime by sulphuric acid; then decompose the remaining neutral tartrate of potassa by chloride of calcium in excess; finally, decompose the resulting tartrate of lime by sulphuric acid, as at first; then strain off the liquid, and crystallize by evaporation.

Chemical Properties.—Tartaric Acid is a white, crystallized solid, in the form of irregular six-sided prisms. Sometimes two opposite sides of the prism become very much enlarged, so as to cause the crystals to present the appearance of tables. It is unalterable in the air, and possesses a strong acid taste, which becomes agreeable when the acid is sufficiently diluted with water. It is soluble in five or six times its weight of cold, and twice its weight of boiling water. It is also soluble in alcohol. A weak solution undergoes spontaneous decomposition by keeping, becoming covered with a moldy pellicle. In the form of crystals it always contains combined water, from which it cannot be separated without previous combination with a base. Its most usual impurity is sulphuric acid, which may be detected by the solution affording, with acetate of lead, a precipitate only partially soluble in nitric acid.

Tartaric acid is *incompatible* with salifiable bases and their carbonates, with salts of potassa, and with the salts of lime, and of lead. It consists, when dry, of two equivalents of hydrogen 2, four equivalents of carbon 24.48, and five equivalents of oxygen 40=66.48; and when crystallized, of one equivalent of dry acid 66.48, and one equivalent of water 9=75.48.

Properties and Uses.—Tartaric acid is refrigerant, antiseptic, and antiscorbutic. It is used as a drink in febrile and inflammatory diseases; being cheaper than citric acid, it forms, when dissolved in water and sweetened, a good substitute for lemonade. It is very much used in medicine, to form acid refrigerant drinks and effervescing draughts. What are called *Soda powders* consist of twenty-five grains of tartaric acid, and half a drachm of bicarbonate of soda, put up in separate papers. When used, the acid and salt are dissolved in separate portions of water, and the solutions mixed and drank in a state of effervescence. These powders furnish a good substitute for soda water. Tartaric acid is also a constituent in the gentle aperient called *Seidlitz powders*. These consist of a mixture of two drachms of tartrate of potassa and soda, (Rochelle salt,) and two scruples of bicarbonate of soda, put up in a white paper, and thirty-five grains of tartaric acid, contained in a blue one. The contents of the white paper are dissolved in about half a pint of water, to which

those of the blue paper are added ; and the whole is taken in a state of effervescence. A colorless solution of sulphate of quinia has long been employed by Eclectics ; it may be made by adding equal parts of tartaric acid and sulphate of quinia to as much water as may be desired.

Off. Prep.—Ferri et Morphiæ Tartras ; Ferri et Quiniæ Tartras ; Quiniæ et Morphiæ Tartras ; Quiniæ et Salicinæ Tartras ; Potassæ Bitartras ; Potassæ Tartras.

ACONITUM NAPELLUS.

Monkshood.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Trigynia.

LEAVES AND ROOT.

Description.—This is a perennial herbaceous plant, also known by the name of *Wolfsbane*; it has a turnip-shaped or fusiform root, from three to six lines in diameter, and three or four inches long ; externally brownish, internally whitish and fleshy, and sending off many long, thick, fleshy fibers. When the plant has arrived at maturity, there are usually two roots united, the older of which is dark-brown, and supports the stem ; the younger is of a light yellowish-brown, and is destined to furnish the stem of the following year. The *stems* are simple, erect, round and smooth ; the *leaves* are alternate, petiolate, divided to the base into five wedge-shaped lobes, which are called trifid, deep green upon their upper surface, light green beneath, and smooth and shining on both sides. The *flowers* are of a dark violet-blue color, large, in a terminal raceme, short pedicels ; the *raceme* is simple and cylindrical. The *petaloid sepals* are five ; the upper being helmet-shaped and concealing the petals ; the lateral broad and rounded ; the lower oblong and deflected. The *petals* not more than two, supported on a peduncle or claw, and have a hooked spur, and a bifid and revolute lip. The *stamens* are filiform, converging, with whitish anthers. The *ovaries* are from three to five, smooth, with simple reflected stigmas. The *capsules* correspond in number with the ovaries, and contain many wrinkled and angular seeds.

History.—Monkshood or Aconite is a native of most parts of Europe, growing in mountain forests and plains, and is cultivated as an ornamental plant in the gardens of Europe and this country. It grows from two to six feet high, and bears a long, dense spike of beautiful, deep-blue flowers, which make their appearance in May and June. The root, which consists of numerous slender radicles, is the most powerful part of the plant, but every portion of it is possessed of highly deleterious properties. There are several varieties, but the *A. Napellus* and *A. Paniculatum* are the only officinal ones. The dried leaves and root retain their acridity and narcotic virtues ; and the expressed juice

possesses the properties of the plant. Its medicinal virtues are best extracted by alcohol, and the alcoholic extract is the most convenient and energetic preparation. It contains an alkaloidal principle, termed Aconita, or Aconitina, a black oily matter, albumen, muriate and sulphate of lime, starch, etc. The smell of the plant is feeble but nauseous, and its taste acrid and bitter, leaving in the mouth a sensation of heat and pungency, and a degree of numbness.

Properties and Uses.—Aconite is an energetic acro-narcotic poison in improper doses, occasioning symptoms of gastric irritation, a peculiar tingling and numbness of the mouth, followed by loss of sensation, and paralysis of the voluntary muscles, but without coma or convulsions. With these symptoms will be thirst, nausea, vomiting, purging, spasms of the stomach and intestines, headache, dimness of vision, the pupils being either dilated or contracted, excessive prostration, pallid countenance, cold extremities, very feeble pulse, and delirium. Death ensues from paralysis of the respiratory muscles. All the above effects are not experienced in every case, though several of them will always be present. On dissection, inflammation of the stomach and bowels is found, with engorgement of the brain and lungs. There is no antidote known for poisoning with monkshood, yet a timely and thorough evacuation of the stomach, with the internal and external use of stimulants, have restored persons in imminent danger to perfect health.

In maximum medicinal doses, it warms the stomach and general system, and sometimes occasions nausea, with tingling and numbness in the lips and fingers, debility of the muscles, force and frequency of pulse diminished, as well as a diminution of the frequency of respiration. Sometimes the tingling and numbness extend over the whole body, with headache, vertigo, neuralgic pains, and general prostration. It should never be given in sufficient quantity to produce these effects. Applied to the eye, Aconitum causes contraction of the pupil.

In anæmical headaches, and in all cases attended with a torpid or paralytic condition of the muscular system, its use is contra-indicated. It is a very useful antiphlogistic remedy, and possesses anodyne, sedative, diaphoretic and diuretic qualities. It is especially useful in febrile and inflammatory diseases, gout, rheumatism, epilepsy, and neuralgic affections. In scarlatina, inflammatory fever, acute rheumatism, pneumonia, peritonitis, gastritis, and many other acute disorders, it has been used with the most decided advantage. Its action is more especially displayed in the higher grades of fever and inflammation. The best preparation is the alcoholic extract, formed by evaporating a tincture made of a pound of aconite and a quart of alcohol. The dose is one-eighth of a grain. One part of the extract, with two of lard, forms an excellent ointment for painful affections. The powdered root or leaves may be given in one or two grain doses, gradually increased. The tincture,

made by macerating one ounce of the powdered root with six ounces of alcohol, for two or three weeks, may be given in doses of eight or ten drops, three times a day, gradually increased, until its effects are obvious. Its continued use sometimes produces vomiting and diarrhea.

Off. Prep.—Extract. Aconiti Alcoholicum; Tinctura Aconiti; Emplastrum Extracti Aconiti Radicis.

ACONITINA.

Aconitina.

Preparation.—Take of Aconite root, dried and bruised, *two pounds*; rectified spirit, *three gallons*; diluted sulphuric acid, solution of ammonia, (Water of Ammonia, *U. S.*,) purified animal charcoal, each a *sufficient quantity*. Boil the aconite with a gallon of the spirit, for an hour, in a retort with a receiver fitted to it. Pour off the liquor, and again boil the residue with another gallon of the spirit and with the spirit recently distilled, and pour off the liquor also. Let the same be done a third time. Then press the aconite, and having mixed all the liquors and filtered them, distil the spirit. Evaporate the remainder to the proper consistence of an extract. Dissolve this in water and filter. Evaporate the solution with a gentle heat, so that it may thicken like syrup. To this add of diluted sulphuric acid, mixed with distilled water, sufficient to dissolve the aconitina. Next drop in solution of ammonia, and dissolve the precipitated Aconitina in diluted sulphuric acid, mixed, as before, with water. Then mix in the animal charcoal, occasionally shaking for a quarter of an hour. Lastly, filter, and having again dropped in solution of ammonia, so as to precipitate the aconitina, wash and dry it.

Chemical Properties.—Aconitina, when freshly precipitated, is said to be white, and in the form of a hydrate; but it speedily parts with its water, and forms a brownish, brittle mass. It is thought not to be crystallizable. When obtained by evaporating its alcoholic solution, it is described as being in the form of a transparent, colorless mass, having a glassy luster. In powder, it is white, with a yellowish tinge. It is inodorous, and of a bitter and acrid taste, producing a benumbing impression on the tongue. It is unalterable in the air, and fusible by a gentle heat. It is sparingly soluble in water, requiring for solution 150 parts of cold, and 50 of boiling water; alcohol or ether dissolves it readily. It neutralizes the acids; but its salts are not crystallizable. That it contains nitrogen is proved by the evolution of ammonia, when it is decomposed by heat. It is *incompatible* with tinctures of iodine, and galls.

Properties and Uses.—Aconitina is too powerful a poison to be used as an internal medicine, yet as an external application, Dr. Turnbull has found it useful in gout, rheumatism, neuralgia, and diseases of the heart. He employed it in the form of tincture or ointment—one grain to one fluidrachm of alcohol, gradually increased to even eight grains; or two grains rubbed first with six drops of alcohol, and then with a drachm of lard, applied by friction three or four times a day; and to be of service, it must produce a sensation of heat and prickling, followed by numbness and a feeling of constriction. It should not be applied to an abraded surface, or to a mucous membrane, lest it prove dangerous.

ACORUS CALAMUS.

Calamus.

Nat. Ord.—Araceæ. *Acoraceæ.* *Sex. Syst.*—Hexandria Monogynia.

THE RHIZOMA.

Description.—Calamus, sometimes called Sweet Flag, has a perennial, horizontal, jointed, and compressed root or rhizome, from six to twelve lines thick, and several feet in length, and which sends off numerous, long, round, and slender radicles, of a whitish or yellowish color, also bunches of brown fibers from its joints, which resemble coarse hair; internally the root is white and spongy, externally whitish with a tinge of green, and the joints are from half an inch to an inch in length, and are variously shaded with different tints of white and red. The *leaves* are radical, sheathing at the base, long, sword-shaped, smooth, green above, but of a reddish color below, variegated with green and white. The *scape* or *flower-stem* resembles the leaves, is usually longer, and from one side near its middle it sends out a naked, solitary, oblique, and cylindrical spadix, tapering at each end, about two inches in length, and closely covered with small, pale or yellowish-green flowers, which have no scent except when bruised. These are without calyx, and have six equal truncated scales, inclosing six stamens, having thick filaments and bilobate anthers. The *ovary* is sessile, three-celled, with a pointed stigma. The *capsule* is several-seeded.

History.—Calamus is found in most parts of the world, growing on the borders of small streams, ponds, wet meadows, swamps, etc., and flowering in May and June. The part used is the root or rhizome. It should be collected late in the autumn, or in the spring, washed, deprived of its fibers, and dried with a moderate heat. The dried roots of the shops are of various lengths, somewhat flattened, of a yellowish-brown color externally and wrinkled, internally whitish, or yellowish-white, and

of light and spongy texture. Water or alcohol take up its virtues. It has a strong and fragrant odor, and a warm bitterish aromatic taste. It contains volatile oil, resin, extractive, etc.; the oil is lighter than water, and is pale-yellow, very odorous and pungent.

Properties and Uses.—A stimulating tonic, and aromatic. Useful in flatulent colic, dyspepsia, atonic conditions of the stomach, various affections of the alimentary canal, and as an adjuvant to quinia and bark in intermittents. It forms an excellent substitute in syrup for Godfrey's Cordial. Externally, it is a valuable application to indolent ulcers, and to keep up the discharge from blistered surfaces and issues. Dose of the infusion, made by scalding an ounce of the root in a pint of water, from four to six fluid ounces; of the root, from a scruple to a drachm. In flatulent colic of infants, it is best combined with magnesia.

Off. Prep.—Decoctum Acorus; Infus. Acorus.

ACTÆA.

ACTÆA ALBA.—White Cohosh.

ACTÆA RUBRA.—Red Cohosh.

ACTÆA SPICATA.—Baneberry.

Nat. Ord.—Actæa. *Sex. Syst.*—Polyandria Monogynia.

THE RHIZOMA.

Description.—Actæa Alba, sometimes called *White Baneberry*, is about two feet high, with large, decomposed leaves; raceme oblong, with pedicels as large as the general peduncle; petals truncate at the apex, and equaling the stamens; berries milk-white; flowers white and appearing late in May.

Actæa Rubra or *Red Baneberry*, is about two feet high, with large decomposed leaves; raceme ovoid or hemispherical, petals acutish and shorter than the stamens; pedicels of the hemispheric raceme, slender and less than the full grown peduncles; berries oval, ripe in summer, cherry red, and forming a raceme three to four inches long; flowers white, and appearing in April and May. The above two plants are natives of this country, they are perennial, herbaceous, and found in the rich deep mold of shady and rocky woods, from Canada to Virginia.

Actæa Spicata, sometimes called *Herb-Christopher*, is a European plant, generally found in mountainous woods, and attaining the height of two or three feet. The stem is erect, leafy, triangular, and but little branched; the root is creeping and perennial: the leaves are petiolated,

twice or thrice ternate; *leaflets* ovate, lobed, unequally serrate; *flowers* white, in a terminal, solitary ovate spike; *pedicels* simple, downy, bracteate at the base. *Sepals* four, deciduous; *petals* spatulate; *stamens* subulate; *ovary* ovate, with a round, sessile stigma; *berries* purplish black, succulent.

History.—The root is of a dark-brown color, with a sweetish, nauseous odor, but which is greatly dissipated by drying; the taste is bitterish and acid. The berries are poisonous, causing delirium and death, or a species of intoxication accompanied with derangement of the cerebral functions, and irritation of the digestive organs.

Properties and Uses.—The recent root of *Actæa Spicata* is a violent purgative, resembling that of the black hellebore in its action; when dried it is not so active. It is seldom employed internally. A decoction used locally is said to cure the itch, and to destroy lice.

The *A. Alba* and *A. Rubra*, possess similar qualities; they are said to possess purgative and emmenagogue properties, and are viewed as substitutes for the *Cimicifuga Racemosa*, and *Caulophyllum Thalictroides*; but this is undoubtedly an error.

ADEPS.

(*Axungia*, Ed. *Adeps Suillus Preparatus*, Dub.)

LARD. THE PREPARED FAT OF THE SUS SCROFA OR COMMON HOG, FREE FROM SALT.

History.—Good lard is white, inodorous, granular in appearance, of a sweetish taste, smooth to the touch, of a soft consistency at ordinary temperatures, fusible at about 100° F., insoluble in water, sparingly soluble in alcohol, more so in ether and the volatile oils, is dissolved and decomposed by the stronger acids, and is converted into soap when boiled with caustic alkaline solutions. When melted it readily unites with resins and wax, on which account it is extensively used in making ointments and liniments. When heated in close vessels, it undergoes a species of destructive distillation, by which margaric, oleic, acetic, and probably benzoic acids are formed, together with other less important modifications of its constituent fatty principles. It consists of three neutral fatty principles, called olein, stearin and margarin, which are found in most animal-oils and fats, and upon the relative proportions of which depends their consistence respectively.

Olein, is the liquid principle of oils; when pure it is colorless, has a sweetish taste, little odor, is insoluble in water, soluble in boiling alcohol, readily soluble in ether, and congeals at 20° F. It is convertible by saponification into glycerin, margaric acid, and oleic acid, and con-

sists of carbon, hydrogen, and oxygen. Lard contains 62 per cent. of olein, which is extensively used for burning in lamps.

Stearin is white, concrete, of a crystalline appearance like spermaceti, pulverizable, fusible at 144° , soluble in boiling alcohol or ether, insoluble in either of these fluids when cold, and convertible by saponification into a peculiar fatty acid, named stearic acid, and glycerin. It consists also of carbon, hydrogen, and oxygen, and may be separated from the concrete matter of lard, by treating this with cold ether so long as anything is dissolved; the stearin is left behind, and the ethereal solution yields margarin by evaporation.

Margarin very closely resembles stearin, but is more fusible; one variety, obtained from animal fats melting at 118° , and being soluble in cold ether; another variety, from vegetable oils, melts at 82° . Lard should be kept in well closed vessels, as if exposed to the air it absorbs oxygen, and becomes rancid, and consequently unfit for medicinal use. When pure it consists of 62 per cent. of olein, and 38 per cent. of stearin and margarin together.

Properties and Uses.—Lard is emollient. It is sometimes used alone in frictions, and is frequently added to laxative enemata; but its chief use is as an ingredient for cerates and ointments. When applied to blistered surfaces, care must be taken that it be not rancid, as it is then apt to cause ulceration.

ADIANTUM PEDATUM.

Maidenhair.

Nat. Ord.—Filices, or Polypodiaceæ. *Sex. Syst.*—Cryptogamia Monogynia.

THE HERB.

Description.—*Adiantum Pedatum* is a delicate and most graceful fern, growing from twelve to fifteen inches high, with the *stipe* or *stalk* and *rachis*, slender, polished, and black or dark-purplish, very glabrous; the *frond* or *leaf* pedate, with pinnate branches; the *pinnæ* halved, triangular-oblong, entire on the lower margin from which the veins all proceed, and incised at the upper and fruit-bearing margin; the *barren segments* are toothed, the *fertile ones* entire. *Sori* linear, oblong; arranged along the margin of the frond; *involucre* formed by turning back the margin of the frond over the sori, and it opens inward. *Petiole* smooth.

History.—This plant is perennial, and is found in deep woods on moist, rich soil, throughout the United States. The leaves are bitterish and somewhat aromatic, and yield their properties to boiling water.

Properties and Uses.—Maidenhair is refrigerant, expectorant, tonic, and sub-astringent. In decoction it forms an elegant refrigerant drink in febrile diseases, and in erysipelas, and is also beneficial in coughs, chronic catarrh, hoarseness, influenza, asthma, etc. It is likewise reputed efficacious in pleurisy, and in jaundice. The decoction or syrup may be used freely. This plant is highly valued by some practitioners, and deserves investigation.

Off. Prep.—Decoctum Adiantum; Infusum Adiantum.

ÆSCULUS HIPPOCASTANUM.

Horse-chestnut.

Nat. Ord.—Hippocastanaceæ—Sapindaceæ, and Æsculaceæ. *Sex. Syst.*—Heptandria Monogynia.

BARK AND FRUIT.

Description.—The *Æsculus Hippocastanum* is a beautiful and lofty tree, with numerous, spreading branches, covered with a rough, brown bark. The wood is white and soft, and is very liable to decay. The leaves are large, on long footstalks, and are composed of seven leaflets arising from a common center, the middle one being the largest; they are of a spatulate form, acuminate, serrate, much varied, and of a bright-green color. The flowers are in thyrsoid racemes or panicles, at the extremity of the branches. Calyx pale-green, five-toothed, and spreading. The corolla is formed of five petals, which are irregular, unequal, spreading, inserted into the calyx by narrow claws, waved at the edges, of a white color, marked below with a yellowish-red spot. The stamens are seven, with awl-shaped filaments, supporting reddish, oblong, double anthers. The ovary is roundish, and furnished with a short style and pointed stigma. The fruit is prickly, coriaceous, roundish, three-celled, and usually containing two seeds, which are exalbuminous, with a brown, shining testa, and a large, paler hilum.

History.—This plant is a native of Asia, and was introduced into Europe and this country, about the middle of the sixteenth century. It is of rapid growth, flowers in May and June, and ripens its fruit late in autumn. The bark has little odor, and an astringent, bitter, not disagreeable taste. It contains tannin.

The *Æsculus Glabra*, or *Buckeye*, common to Ohio, and other Western States, is said to be useful as a substitute for the *Æsculus Hippocastanum*.

Properties and Uses.—Horse-chestnut Bark is tonic, astringent, febrifuge, narcotic, and antiseptic. It has been found very efficacious in

the treatment of intermittent fever, given in doses of from half an ounce to an ounce of the bark, in the course of twenty-four hours. It is inferior, however, to cinchona. Ten grains of the powder of the rind of the nuts, have been found equivalent, in narcotic power, to three grains of opium. A strong decoction of the bark has been recommended as a lotion to gangrenous ulcers. The powdered kernel of the fruit produces sneezing, and has been used as a sternutatory in complaints of the head and eyes.

AGARIC.

Touchwood. Spunk. Tinder.

Nat. Ord.—Fungales, or Fungaceæ. *Sex. Syst.*—Cryptogamia Fungi.

History.—This is the product of different species of a genus of mushrooms, denominated *Boletus*. The *Boletus Laricis* which grows upon the larch of the old world, is the *white agaric*, or *purging agaric* of medical writers. It is of various sizes, from that of the fist, to that of a child's head, is hard, spongy, brownish or reddish externally, and internally of a light, white, spongy, somewhat farinaceous, friable mass, which, though capable of being rubbed into powder upon a sieve, is not easily pulverized in the ordinary mode, as it flattens under the pestle. It has a sweetish, very bitter taste.

The *Boletus ignarius*, or *agaric of the oak*, is compared in shape to the horse's hoof. Its diameter is from six to ten inches when young, it is soft like velvet, but subsequently becomes hard and ligneous. On the upper surface, it is smooth, but marked with circular ridges of different colors, more or less brown or blackish; on the under, it is whitish or yellowish, and full of small pores; internally it is tough and fibrous, and of a tawny-brown color. It is composed of short tubular fibers compactly arranged in layers, one of which is added every year. It has neither taste nor smell. The best is that which grows on the oak, and collected in August or September. It is prepared for use by removing the exterior rind or bark, cutting the inner part into thin slices, and beating these with a hammer until they become soft, pliable, and easily torn by the fingers.

Properties and Uses.—The *White Agaric* has been found useful in checking the night-sweats of phthisis, and other diseases, in the dose of eight grains, and gradually increased to a drachm during the day, and produces no inconvenience to the digestive functions. It is said to act as a cathartic with some persons, in doses of from six to thirty grains.

The *agaric of the oak*, is principally used for arresting hemorrhage from wounds, leech-bites, etc., it is immediately applied to the part with

pressure, and acts probably mechanically, by absorbing the blood and causing it to coagulate. In severe cases it is not to be relied upon. It has sometimes been applied to the purposes of moxa. Steeped in a solution of nitre, and dried, it becomes very inflammable, and is used as a tinder under the name of *Spunk* or *Punk*.

AGAVE VIRGINICA.

False Aloe.

Nat. Ord. Amaryllidaceæ. *Sex. Syst.* Hexandria Monogynia.

THE ROOT.

Description.—This is a perennial, herbaceous, stemless or scape-bearing plant, with a premorse, tuberous root. The leaves are linear-lanceolate, fleshy, glabrous, radical, with cartilaginous serratures on the margin. The scape is simple, glabrous, with leaf-like scales and sessile flowers, terete, and from three to six feet in height. The flowers are scattered in a loose, wand-like spike, very fragrant, greenish-yellow, with the tube longer than the acute segments. The corolla is erect, superior, tubular or funnel-form; filaments erect, longer than the corolla; anthers introrse. Capsule roundish, obscurely triangular, three-furrowed, three-valved, three-celled, and many-seeded.

History.—This plant is common to Pennsylvania and the Southern States, growing on dry or rocky banks, and flowering in August and September. In South Carolina, it is known by the name of *Rattlesnake's Master*, and is considered an antidote to the bite of that reptile. The root is the part used, it is very bitter, and yields its properties to alcohol.

Properties and Uses.—False aloe is reputed laxative and carminative, and has been beneficially employed in flatulent colic, and in obstinate diarrhea. It is also said to be a valuable counter-poison to the bites of snakes.

The *Agave Americana*, or American Aloe, also called American Agave, and Century Plant, is an evergreen succulent plant, growing in Florida, Mexico, and other parts of tropical America; it bears a strong resemblance to the plants of the genus Aloe, with which it is sometimes confounded. The root and leaves when cut furnish a saccharine juice, which may be converted into syrup or sugar by evaporation, and into a vinous liquor by fermentation. When evaporated to the consistence of a soft extract, it forms a lather with water, and is sometimes employed as a substitute for soap. The fresh juice is said to be diuretic, laxative, and emmenagogue. G. Perrin, M. D., of U. S. A., strongly

recommends the juice of the Am. Aloe, as a remedy in scorbutus, superior to all others. The juice is prepared by cutting the leaves off close to the root, then placing them in hot ashes until thoroughly cooked, when they are removed, and the juice expressed and strained. It is not disagreeable to take, agrees with the stomach and bowels and may be given in doses of from one to three ounces daily.

AJUGA CHAMÆPITYS.

Ground Pine.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE LEAVES.

Description.—Ground-Pine has an annual diffused *stem*, with three-cleft *leaves*; and the *flowers* solitary and axillary, shorter than the leaves. *Corolla* with the upper lip minute and two-toothed. *Stamens* longer than the upper lip; *anthers* all reniform, one-celled.

History.—This is a low-creeping plant, a native of Europe, but found also in some parts of the United States, and known sometimes under the names of *Bugle* or *Germander*. The leaves, which are the parts used, bear some resemblance to those of the pine in shape, and possess a strong, peculiar, resinous, not disagreeable odor, and a bitter, balsamic taste. By distillation with water, they yield a small proportion of volatile oil, resembling that of turpentine. Their virtues are imparted to diluted alcohol.

Properties and Uses.—Ground-pine is stimulant, tonic, diuretic, and aperient; it has been successfully employed in palsy, gout, rheumatism, and amenorrhea. It is said to be especially useful in uterine diseases, and paralytic disorders; also in dropsy, jaundice, strangury, and all visceral obstructions. Externally, the decoction forms an excellent wash for old and indolent ulcers. Dose of the leaves in powder, one or two drachms; but the vinous infusion is considered the best preparation; its dose is from half a fluidrachm to two fluidrachms.

AGRIMONIA EUPATORIA.

Agrimony.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Digynia.

THE ROOT AND LEAVES.

Description.—Agrimony is a perennial herb, with a reddish, tapering, not creeping *root*, branched at the summit. The *stems* are from one to

three feet in height, leafy, scarcely branched, and covered with soft, silky hairs. The *leaves* are alternate, nearly smooth beneath, interruptedly pinnate, and consist of three, five, or seven oblong-obovate, or oval-lanceolate *leaflets*, from one to three inches long, and about one-third as wide, sessile, coarsely serrated, almost glabrous, with various minute intermediate ones; the terminal leaflet with a short petiolule. *Stipules* of the upper leaves, large, rounded, dentate or palmate. *Flowers* very numerous, subsessile, yellow, in a dense tapering spike, with lobed bracts; they are about four lines in diameter. *Racemes* six to twelve inches long, spicate. *Petals* five, rarely twice the length of the calyx. *Calyx* inferior, five-cleft, invested with an outer lobed one; *calyx-tube* curiously fluted with ten ribs, and surmounted with reddish-hooked bristles. *Stamens* twelve; *carpels* two; *fruit* hispid.

History.—Agrimony inhabits Asia, Europe, and North America. In this country it is found in fields, on the borders of woods, and along the roadsides, bearing a yellow flower in July and August. It is sometimes known by the name of *Cockle-burr*, *Stickwort*, etc. It has an agreeable aromatic odor, which is strongest in the flowers, and a rough, bitterish, aromatic taste, which is more powerful in the root. It yields its properties to water.

Properties and Uses.—Agrimony is a mild tonic, alterative and astringent. A decoction of it is highly recommended in bowel-complaints, passive hemorrhages, gonorrhea, leucorrhea, and chronic affections of the mucous membranes; likewise in jaundice, and visceral obstructions, and as an alterative in cutaneous diseases. A strong decoction, sweetened with honey, is reputed an invariable cure for scrofula, if its use be persisted in for a length of time; and it has also been highly extolled in the treatment of gravel, asthma, coughs, and obstructed menstruation. Dr. D. C. Payne speaks highly of a continued use of a decoction of this plant in the treatment of erysipelas, and scrofulous affections, to be used freely in connection with diet and regularity of the bowels. As a gargle, the decoction is useful in ulcerations of the mouth and throat. Dose of the powdered leaves, one or two drachms; of the decoction from one to three fluidounces. The root is very astringent, and may be used wherever this class of agents is indicated. The plant has been also celebrated as a vermifuge.

Off. Prep.—Decoctum Agrimoniae; Infusum Agrimoniae.

ALCOHOL.

ABSOLUTE ALCOHOL.—Hydrate of oxide of Ethyle. Specific gravity, 0.794–6.

SPIRITUS RECTIFICATUS.—Rectified spirit. Specific gravity, 0.835.

ALCOHOL DILUTUM.—Proof Spirit. Diluted Alcohol. Specific gravity, 0.935.

Preparation.—Alcohol is a peculiar liquid, generated for the most part in vegetable juices and infusions, by a fermentation called the vinous or alcoholic. The liquids which have undergone it are called vinous liquors, and are of various kinds; thus, the fermented juice of the grape is called Wine; of the apple, Cider; the fermented infusion of malt, Beer. This fermentation is owing to the presence of sugar in these liquids, and in other instances, to the conversion of starch into sugar, by some unknown spontaneous change.

In vinous liquors, the alcohol is diluted with abundance of water, and associated with coloring matter, volatile oil, extractive, and various acids and salts. In purifying it we take advantage of its volatility, which enables us to separate it by distillation, combined with some of the principles of the vinous liquors employed, and more or less water. The distilled product of vinous liquors forms the different varieties of ardent spirit of commerce. When obtained from wine, it is called Brandy; from fermented molasses, Rum; from cider, malted barley, or rye, Whisky; from malted barley and rye-meal with hops, and rectified from juniper berries, Holland Gin; from malted barley, rye or potatoes, rectified with turpentine, Common Gin; and from fermented rice, Arrack. These spirits are of different strengths, that is, contain different proportionate quantities of alcohol, and have various peculiarities by which they are distinguished by the palate. Their strength is accurately judged of by the specific gravity, which is always inversely proportionate to their concentration. When they have a sp. gr. of 0.920 they are designated in commerce by the term Proof Spirit. If lighter than this, they are said to be above proof; if heavier, below proof. *Proof spirit* may be considered as corresponding with the average strength of the weaker alcohol used in pharmacy.

Proof spirit is still very far from being pure; being a dilute alcohol, containing about half its weight of water, together with essential oil and other foreign matters. It may be further purified and strengthened by re-distillation, or *rectification* as it is called. Whisky is the spirit usually employed for this purpose, and from every hundred gallons, between fifty-seven and fifty-eight will be obtained, of the average strength of rectified spirit, (sp. gr. 0.835,) corresponding to the *alcohol* of the United States' Pharm., and the *Spiritus Rectificatus* of the London and Dublin

Colleges. When this is once more cautiously distilled, it will be further purified from water, and attain the sp. gr. of about 0.825, which is the lightest spirit which can be obtained by ordinary distillation. It still, however, contains eleven per cent. of water. In the meanwhile, the spirit, by these repeated distillations, becomes more and more freed from essential oil, called *Grain*, or *Fusel Oil*.

If it be desired to obtain alcohol of still greater concentration, (*Absolute alcohol*), it is necessary to avail ourselves of certain substances which have a powerful affinity for water. Of this nature, are lime, carbonate of potassa, and chloride of calcium. These, being mixed with the rectified spirit, unite with water and sink, while the purer spirit floats above, and may be separated by decantation or distillation. By availing themselves of substances of this nature, the London and Dublin Colleges are enabled to produce their strongest spirit, which they denominate *Alcohol*.

Souberain recommends the following as an easy method for obtaining alcohol free from water, abundantly and economically:—"1st. Rectify alcohol, marking 86° of the centesimal alcoholmeter of Gay-Lussac (rectified spirit) by distilling it from carbonate of potassa. This operation raises its strength to 94° or 95°. 2d. Raise this alcohol to 97°, by distilling it with fused chloride of calcium, or by digesting it with quicklime, from which it must be afterward poured off, in the proportion of a pint of the alcohol to 1½ ounces of the chloride, or 2¼ ounces of the lime. 3d. Distil the product of this operation slowly with quicklime, in the proportion of 3¾ ounces to the pint. The product will be absolute alcohol. The operation may be shortened to two steps, by distilling the alcohol of 94° or 95°, with an excess of quicklime (7½ ounces to the pint). In all cases, before decanting or distilling, the alcohol must be digested for two or three days with the lime, at a temperature between 95° and 100° F. Lime will not answer as a substance to be distilled from, unless it be in sufficient excess; for otherwise, toward the end of the distillation, the hydrate of lime formed, will yield up its water to the alcohol, and weaken the distilled product."

Although freed from water by the processes named, alcohol may still be impregnated with a portion of the essential oil, called *grain* or *fusel oil*. This is usually removed by digesting the spirit with charcoal, especially animal charcoal. The same end may be attained on a small scale, by adding a little of the solution of nitrate of silver to the spirit, and exposing it to a bright light. By the action of the oxide of silver on the oil, it is converted into a black powder, and by a new distillation, the spirit is obtained pure.

With the exception of alcohol and whisky, but very little pure liquors are to be had in this country, as they are superseded by the domestic articles manufactured by liquor dealers. The following formulæ for the manufacturing of domestic liquors, are from an old dealer and manufacturer.

Domestic Gin is made of neutral spirits forty gallons, good Holland gin four gallons, oil of Juniper three ounces, oil of Anise one ounce; mix together. *Domestic brandy* consists of neutral spirits one gallon, good brandy one pint, molasses, q. s. to color, sweet spirits of nitre eight ounces.

History.—Alcohol is a colorless, transparent, volatile liquid, of a penetrating, agreeable odor, and strong burning taste. When free from water of dilution, it is called *anhydrous* or *absolute alcohol*, and has the specific gravity of 0.793 at the temperature of 60°. If a piece of anhydrous baryta be dropped into the liquid, if any water be present it will fall to powder; otherwise, it will not. Alcohol is inflammable, and burns without smoke or residue, the products being water and carbonic acid. When strong, the flame is bluish, but yellowish when weak. It combines with water and ether in all proportions, and is capable of dissolving a great number of substances, as sulphur, phosphorus, iodine, ammonia, caustic potassa, soda, and lithia; also the organic vegetable alkalies, urea, tannic acid, sugar, mannite, camphor, resins, balsams, soap, castor oil, and volatile oils; also most of the chlorides that are readily soluble in water; some nitrates, none of the metallic sulphates, nor the insoluble efflorescent salts. It dissolves fixed oils sparingly, acts on most acids, forming ethers with some, and effecting the solution of others, and dissolves all deliquescent salts, except carbonate of potassa. Alcohol is represented by $C_4 H_4 + 2HO$ —equivalent 46.

Properties and Uses.—A powerful, diffusible stimulant, and is the intoxicating ingredient in all malt, spiritous, and vinous liquors. It is never used in its pure state in medicine, but when diluted forms a menstruum for many remedies. In the form of brandy, it is useful in all cases of prostration or sinking, especially in typhus. Brandy is said to be cordial and stomachic; rum, heating and sudorific; gin and whisky, diuretic. The danger of manufacturing drunkards by the administration of wine or brandy, bitters, cordials, and the like, which was so common a few years since, we are glad to say, has now almost entirely ceased; and although alcoholic tinctures are sometimes prescribed, yet it is in such small doses, and so well diluted with water, that no fear of intemperance can arise in the mind of the physician. There are very few cases in which alcoholic stimulants are given, and those are never of a chronic character, or in which these fluids have to be used longer than a few days. The discovery of our concentrated preparations, and improved modes of treating disease, have done much to set aside this dangerous and unscientific practice.

Externally, alcohol is sometimes applied to produce cold by evaporation, or to stimulate where its evaporation is repressed; and enters into many discutient and stimulating lotions. A mixture of equal parts of white of egg and rectified spirit, is said to be an excellent application

to excoriations from pressure, during their early stage, occurring in protracted diseases. To be applied frequently with a fine brush or feather, and renewed as it dries, until an albuminous coating is formed over the excoriated surface.

Alcohol is extensively employed in pharmacy, either rectified or diluted, for the manufacture of tinctures, spirits, ether, essences, resinous and alcoholic extracts, and for many other purposes.

ALCOHOL AMYLICUM.

Amylic Alcohol.

Preparation.—Take of the light liquid, which may be obtained at any large distillery, by continuing the distillation for some time after the pure spirit has all been drawn off, *any quantity*. Introduce it into a small still or retort connected with a condenser, and apply heat so as to cause distillation; as soon as the oil begins to come over unmixed with water, the receiver should be changed, and the distillation being resumed and carried nearly to dryness, the desired product will be obtained. The liquid drawn over during the first part of the distillation will consist of an aqueous fluid, surmounted by a stratum of the Amylic Alcohol. This latter, though impregnated with a minute quantity of water, should be separated and preserved, as being sufficiently pure for use.

History.—This oil has various names, as *Fusel oil*, *Grain oil*, *Corn-spirit oil*, *Potato-spirit oil*, and *Hydrated oxide of amyle*. It is always present in the products of the alcoholic fermentation, and is an ingredient in the ardent spirit obtained from various kinds of grain, but is most abundant in that procured from fermented potatoes. It is present in grain spirit in the proportion of about one part in five hundred by measure. If the whisky procured from grain or potato is distilled to obtain its alcohol, the pure spirit will come over for a certain time, after which, if the distillation be continued, a milky liquid will be obtained, which, upon standing, will be covered with a stratum of this peculiar oil. Subjected to distillation, the milky liquid will at first boil at a comparatively low temperature, and yield water, and a little of the oil; but after a time the boiling point will rise to 269°, when the oil will come over pure. By changing the receiver when the oil begins to distil free from water, the pure oil is collected, separate from the watery part.—*U. S. Disp.*

Fusel oil is a colorless, oily liquid, very mobile, of a strong and nauseous odor which produces stupefying effects, and an acrid, burning, very disagreeable taste. Its vapor when inhaled, causes cough and spasmodic dyspnoea, resembling asthma, often followed by vomiting. As usually prepared its color is pale-yellow. Its specific gravity is

0.818; that of its vapor 3.15. It boils at 269° , and at -4° it crystallizes in shining scales. It is soluble in all proportions in alcohol or ether, but is very sparingly so in water. It dissolves iodine, sulphur, and phosphorus, and forms a good solvent for fats, resins, and camphor. It does not leave a greasy stain upon paper, nor take fire by contact with flame, but begins to burn only when heated to about 130° . It consists of ten equivalents of carbon 60, twelve of hydrogen 12, and two of oxygen $16=88$. When heated with dry hydrate of potassa it is oxidized, two equivalents of hydrogen are given off, and two of oxygen absorbed, and the potassa is found combined with valerianic acid $C_{10}H_9O_3$. It is generally considered to be a hydrated oxide of amyle, its formula being $C_{10}H_{11}O+HO=Ayl\ O\ HO$.

Properties and Uses.—Fusel oil is used in the preparation of valerianic acid, valerianate of soda, etc.

ALETRIS FARINOSA.

Unicorn Root.

Nat. Ord.—Liliaceæ, *Lindley*. Hæmodoraceæ, *Brown*.—*Sex. Syst.* Hexandria Monogynia.

THE ROOT.

Description.—Aletris Farinosa, also known by the several names of *Star-grass*, *Colic-root*, *Ague-root*, *Crow-corn*, etc., has a pre-morse, perennial root, with radicle leaves, spreading on the ground like a star, sessile, ribbed, broad-lanceolate, entire, smooth, of a pale-green or glaucous color, veined longitudinally, and of unequal size, the largest being about four inches long, and one-fourth as wide. From the center of the leaves arises the *scape* or *flower-stem*, which is from one to three feet high, erect, simple, with remote scales or bracts, which sometimes expand into small subulate leaves. *Spike* slender, scattered, each *flower* with a short pedicel and a minute bract. *Calyx* wanting. *Perianth* white, of an oblong bell-shape, divided in the limb into six acute, spreading segments; the outside, especially as the flower grows old, has a wrinkled, roughish, or mealy appearance. *Stamens* six, short, inserted near the mouth of the perianth at the base of the segments; *ovary* three-lobed, pyramidal, tapering, semi-inferior; style triangular, separable into three. *Capsule* triangular, invested with the permanent perianth, three-celled, three-valved at top. *Seeds* numerous, minute, fixed to a central receptacle.

History.—Unicorn Root is found in most parts of the United States, usually in dry sandy soils and barrens. Its flowers are white and appear in June and July. The root is the officinal portion, which is small, crooked, blackish externally, brown or whitish within, and intensely bitter. Alcohol is its best solvent. (*See Helonias Dioica.*)

Properties and Uses.—Unicorn Root, in the recent state and in large doses, is considerably narcotic, with emetic and cathartic properties. When dried these properties are destroyed, and it becomes a bitter tonic. It has been used in decoction or tincture, in flatulent colic, hysteria, and to increase the tone of the stomach. It is of much utility in dyspepsia, as well as in cases of general or local debility. But its most valuable property consists in the tonic influence it exerts upon the female generative organs, giving a normal energy to the uterus, and thus proving useful in cases where there is an habitual tendency to miscarriage. In chlorosis, amenorrhea, dysmenorrhea, and engorged conditions of the uterus, as well as in prolapsus of that organ, it is one of our best vegetable agents. The alcoholic extract is an elegant form in which to employ it, in the above affections. In uterine diseases it may be given alone with advantage, or employed in combination with asclepidin, senecin, caulophyllin, or cimicifugin. In flatulent colic and borborygmi, a mixture of dioscorein two grains, ginger four grains, and alcoholic extract of aletris two grains, may be divided into two pills, of which one may be given every two or three hours with decided benefit. (*See asclepidin*). The resinous extract of the root, *aletrin*, is not so much employed at present, as the alcoholic extract *aletridin*, although it possesses active properties. Dose of the powdered root, from five to ten grains, three times a day; of the saturated tincture, from five to fifteen drops, in water.

Off. Prep.—Extractum Aletridis Alcoholicum.

ALISMA PLANTAGO.

Water Plantain.

Nat. Ord.—Alismaceæ. *Sex. Syst.*—Hexandria Polygynia.

THE LEAVES.

Description.—This is a perennial, caulescent herb, sometimes called *Mad-dog weed*. The *leaves* are radical, oval, oblong or lanceolate, subcordate at the base, cuspidate or abruptly acuminate, five to nine-nerved, from four to six inches in length, about two-thirds as wide, and on long radical petioles. The *scape* is one or two feet high, with whorled paniced branches; the *panicles* are loose, compound, many-flowered; branches of the panicle with bracts at the base. *Carpels* fifteen to twenty, obliquely obovate, forming an obtusely-triangular whorl in fruit. The *flowers* are small, white, whorled, and numerous; *petals* three, tinged with purple, roundish, deciduous, larger than the green, ovate, persistent sepals. *Stamens* six; *achenia* obtusely three-cornered. *Root* fibrous.

History.—Water Plantain is common to Europe and the United States, being a smooth, handsome inhabitant of ponds, ditches, streams, etc., flowering in July. At one time the root was in great repute as a cure for hydrophobia, but subsequent experiments have proved it inefficacious. The leaves are the parts used.

Properties and Uses.—When the fresh leaves of water-plantain are bruised and applied to the skin, they produce a rubefacient effect, and will even vesicate. When dried and powdered, and taken in the dose of one or two drachms two or three times a day, they have been successfully employed in gravel and other urinary affections.

ALLIUM SATIVUM.

Garlic.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE BULB.

Description.—This is a very extensive genus, including over sixty species. The *Allium Sativum* is officinal; it is a perennial plant, bulbous. The *bulbs* are numerous, and inclosed in a common membranous covering, from the base of which the fibers that constitute the proper root descend. The *stem* is simple, and is about two feet high. The *leaves* are long, acute, flat, distichous, glaucous, channeled above, sheathing the lower half of the stem. At the termination of the stem is a cluster of flowers and bulbs mingled together, and inclosed in a calyptriform, horned spathe, which opens on one side and withers. *Umbels* bulbiferous. The *flowers*, if any, are pink, red, or whitish, rather longer than the stamens and appear in July. *Perianth*, deeply six-parted, segments mostly spreading, permanent, equal; *ovary* angular; *stigma* simple, acute; *capsule* three-lobed. It is a native of Sicily, but cultivated in various sections of the country.

History.—The part employed is the bulb, which is usually dug up, with a portion of the stem attached, and after having been dried in the sun, are tied together in bunches. They lose nine parts in weight by drying, while their sensible properties are but little diminished. They possess a disagreeable, pungent odor, and an acrid, bitter taste, both of which are owing to the presence of an essential oil which is very volatile. The oil is of a yellow color, exceedingly pungent odor, and strong acrid taste; is heavier than water, contains sulphur, and irritates or even vesicates the skin when applied to it. Water, alcohol, or vinegar, extract the virtues of garlic.

Properties and Uses.—Stimulant, diuretic, expectorant, and rubefacient. Used as a medicine, and for culinary purposes. When taken

internally, the active principle is speedily absorbed, and, penetrating the system, becomes sensible in the breath and various secretions, and is said to produce the same effects, when applied externally. Taken internally, garlic quickens the circulation, excites the nervous system, promotes expectoration in a debilitated state of the vessels of the lungs, produces diuresis or diaphoresis according as the patient is kept cool or warm, and acts as a tonic and carminative to the stomach. It has been beneficially used in coughs, catarrhs, hooping-cough, hoarseness, worms, and calculous affections during the absence of inflammation. It is very useful in the nervous and spasmodic coughs of children. The juice, given in the dose of a few drops, is said to check nervous vomiting; and mixed with olive or sweet-almond oil, is recommended in atonic deafness. Garlic juice, sweet oil of almonds, and glycerin, of each, equal parts, mixed, and dropped in the ear, has cured several cases of deafness. Externally, the bruised bulbs, applied as a poultice above the pubes, has restored the action of the bladder, in cases of retention of urine, from debility of that organ. In the same shape, it may be applied to the spine and chest of infants in pneumonia; to the feet and legs, as a revulsive, in disorders of the head, and febrile complaints of children; and has been employed as a resolvent in indolent tumors, stimulating the absorbents to action. It may be taken whole, or the juice may be administered mixed with sugar. The dose of the fresh bulb is from half a drachm to two drachms; of the juice, half a drachm. If used too largely, or in excited states of the system, it is apt to produce flatulence, gastric irritation, hemorrhoids, headache, and fever.

ALLIUM CEPA.

Onion.

Nat. Ord.—Liliaceæ. *Tribe*—Scilleæ. *Sex. Syst.*—Hexandria Monogynia.

THE BULB.

Description.—The onion is a biennial plant, the root bearing a tunicated bulb, compressed, or round, or oblong in figure, invested with a shining, thin, dry membrane. The *scape*, which appears the second year, is from two to four feet high, straight, naked, smooth, stout, fistulous, bearing at the top a large, round umbel of greenish-white flowers, and swelling toward its base. The *leaves* are fistulous, terete, distichous, glaucous, acute, shorter than the stem. *Spathe* reflexed, generally longer than the lower flowers. *Umbels* large, regular, compact, many-flowered, not bulbiferous. *Pedicels* about an inch long, thickened at the point. *Stamens* nearly twice as long as the perianth.

History.—The onion is supposed to be a native of Hungary, but is now found over the whole civilized world. The bulbs are of various shapes and sizes, are composed of concentric fleshy and succulent layers, and according to the variety are reddish, yellowish, or white. They have, in a high degree, the peculiar pungent odor of the plant, with a sweetish and acrid taste. It contains a white acrid volatile oil holding sulphur in solution, albumen, much uncrystallizable sugar and mucilage, phosphoric acid both free and combined with lime, acetic acid, citrate of lime, and lignin. The expressed juice is susceptible of the vinous fermentation.

Properties and Uses.—The onion is stimulant, diuretic, expectorant, and rubefacient; used moderately it increases the appetite, and promotes digestion, but in large quantities it is apt to occasion flatulence, gastric uneasiness, and febrile excitement. The juice, mixed with sugar, forms a pleasant syrup, useful in coughs, catarrhs, and croup, to be given in the absence of much inflammatory action. Roasted and split, it is occasionally employed as an emollient cataplasm to boils and other suppurating tumors. In dropsy and gravel, a saturated tincture made with good gin, has been recommended. Boiling deprives the onion of its essential oil, and it then becomes a mild esculent, much used as food.

ALNUS RUBRA.

Tag Alder.

Nat. Ord.—Betulaceæ. *Sex. Syst.*—Monoecia Tetrandria.

THE BARK.

Description.—This plant is the *Alnus Serrulata* of Aiton and Willdenow, and is known by the names of *Smooth Alder*, and *Common Alder*. It is a well-known shrub growing in clumps, and forming thickets on the borders of ponds and rivers, and in swamps. The stems are numerous, rather straight, and from six to fifteen feet in height. The leaves are obovate, acuminate, doubly serrulate with minute teeth, thickish, smooth and green on both sides, strongly veined, the veins and their axils being hairy beneath, from two to four inches long, by two-thirds as wide, and on petioles one-half or one-third of an inch long. The stipules are elliptical and obtuse. Aments two or three inches long, slender, pendulous, fasciated at the ends of the branches; fertile aments short, thick, dark-brown, persistent, ovoid-oblong, several together a little below the sterile one. Stamens four. Fruit ovate.

History.—This shrub blossoms in March and April, bearing flowers of a reddish-green color. The bark is the part used and imparts its properties to boiling water.

Properties and Uses.—Tag Alder Bark is alterative, emetic, and astringent. A decoction or extract of it is useful in scrofula, secondary syphilis, and several forms of cutaneous disease. The inner bark of the root is emetic; and a decoction of the cones is said to be astringent, and useful in hematuria, and other hemorrhages. An excellent ophthalmic powder is made by boring a hole from half an inch to an inch in diameter, lengthwise, through a stout piece of a limb of tag alder. Fill the opening with finely-powdered salt, and close it at each end. Put it into hot ashes, and let it remain till the tag is almost all charred, (three or four days,) then split it open, take out the salt, powder, and keep it in a vial. To use it, blow some of the powder in the eye, through a quill. An article named *Alnuine* is said to have been obtained from this plant, which possesses alterative, tonic, and astringent properties, and is recommended in herpes, syphilis, scorbutus, scrofula, impetigo, etc., in doses of one to three grains, three or four times a day. Likewise an essential agent, *Alnuin*, for the same purpose. We have not been advised of the manner in which these agents are prepared, and therefore can say but little concerning them.

Off. Prep.—Decoctum Alnûs, Infusum Alnûs.

ALOE SPICATA.

Aloes.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

INSPISSATED JUICE OF THE LEAVES.

Description.—The *Aloe Spicata*, or *Spiked Aloe*, is a native of South Africa, growing near the Cape of Good Hope, in sandy soil. The *stem* is woody, round, from three to four feet high, about five inches in diameter, and leafy at the summit; the *leaves* are thick, fleshy, spreading, subverticillate, about two feet long, broad at the base, gradually narrowing to the point, channeled or grooved on their upper surface, remotely toothed upon their edges; their *parenchyma* almost colorless. *Spike* a foot long, very compact, with horizontal and campanulate *flowers*, of a scarlet color, which contain a large quantity of purplish honey juice. Beneath each flower is a broad, ovate, acute *bracte*, of a white color, with three green streaks, and nearly as long as the corolla. The three *inner petals* are ovate, obtuse, white, with a triple green line, and broader than the three outer, which otherwise resemble them. The *stamens* are much longer than the perianth.

Aloe Socotrina, is said to be a native of the island of Socotra; its stem is erect, woody, a foot and a half high, or more, naked below, where it

is strongly marked with the scars of former leaves; the *leaves* are at the summit of the stem, amplexicaul, green, ascending, ensiform, rather concave on their upper surface, convex beneath, and curved inward at the point, and marked with numerous small, white marginal serratures; the *parenchyma* abounding in a bright brownish-yellow juice. *Raceme* cylindrical, unbranched; the *flowers* are scarlet at the base, pale in the center, and greenish at the point. The *stamens* are unequal, three of them being longer than the corolla.

Aloe Vulgaris, is a native of south-eastern Europe, and north Africa, and is cultivated in Italy, Sicily, Malta, and the West Indies. It has a short, simple, cylindrical and woody stem; the *leaves* being fleshy, amplexicaul, first spreading, then ascending, lanceolate, glaucous-green, a little mottled with darker spots, flat on the upper surface, convex beneath, and armed with hard reddish spines, distant from each other, and perpendicular to the margin; the *parenchyma* is slightly colored brown, and very distinct from the tough leathery cuticle. The *scape* is axillary, glaucous-reddish, branched; *spike* cylindrical-ovate. The *flowers* at first erect, then spreading, afterward pendulous, yellow and not longer than the stamens.

The juice obtained by expression from the parenchyma is mucilaginous, and possesses but little medicinal virtue; the proper aloetic juice is obtained from the inter-cellular passages found between the longitudinal vessels which are situated beneath the epidermis of the leaves, and which juice may be readily obtained by cutting these in a transverse direction.

History.—There are several species of Aloe, from which the officinal drug is obtained—the *A. Spicata*, *A. Socotrina*, *A. Vulgaris*, etc., which grow in various parts of the world, the first at the Cape of Good Hope, furnishing the Cape Aloes; the second in the island of Socotra, from whence is taken the Socotrine Aloes; and the third, in the East and West Indies, Italy, Spain, Barbary coast, etc., which furnish the Barbadoes Aloes.

Cape Aloes, when freshly broken, has a very dark olive or greenish color, approaching to black, with a smooth, bright surface, and translucent edges. The powder is of a fine greenish-yellow color. It has a strong, disagreeable, but not nauseous odor, and a peculiar bitter taste. It is sometimes confounded with the Socotrine Aloes, especially the finer sorts. *Socotrine Aloes*, is in pieces of a yellowish, or reddish-brown color; its interior surface lighter than its exterior, but rendered darker by exposure to the air. Its surface is somewhat glossy, and its fracture smooth and conchoidal, with sharp, semi-transparent edges. Its powder is bright-yellow. The odor is peculiar, not unpleasant, with a bitter, disagreeable, but aromatic taste. It is the best article for medicinal purposes. *Barbadoes Aloes*, is very little used, except in veteri-

nary practice. Beside these, we have several other varieties, useless to name here.

Aloes yields its active matter to cold water, and when good, is almost wholly dissolved by boiling water ; but the inert portion, or *apothême* of Berzelius, is deposited as the solution cools. It is also soluble in alcohol, rectified or diluted. Long boiling impairs its purgative properties, by converting the aloësin into insoluble *apothême*. The alkalies, their carbonates, and soap, alter, in some measure, its chemical nature, and render it of easier solution. It is inflammable, swelling up and decrepitating when it burns, and giving out a thick smoke which has the odor of the drug. Those substances only are *incompatible* with aloes, which alter or precipitate the aloësin, as the insoluble portion is without action upon the system. Its aqueous solution keeps a long time, even for several months, without exhibiting moldiness or putrescency ; but it becomes ropy, and acquires the character, which it did not previously possess, of affording an abundant precipitate with the infusion of galls. Analysis has detected in aloes, 85 parts in 100 of bitter extractive, called *aloësin*, 2 of ulmate of potassa, 2 of sulphate of lime, 0.25 of gallic acid, 8 of albumen, and traces of carbonates of potassa and lime, and phosphate of lime.

Properties and Uses.—Tonic, purgative, emmenagogue, and anthelmintic. In doses of from half a grain to a grain, two or three times a day, it exerts a decided tonic influence, but is seldom resorted to for this purpose. As a laxative and purgative, its applications are unbounded ; it acts more especially on the muscular coat of the large intestines, rather increasing their peristaltic motion, than effecting copious thin or watery discharges ; and from its tendency to irritate the rectum, especially when frequently repeated, it is apt to give rise to hemorrhoids, or aggravate them when already existing. When applied endermically to an ulcer or blistered surface, it purges as effectually and promptly as when taken into the stomach ; ten grains used thus, will purge in from six to ten hours. It is commonly supposed to have no action on the jejunum or ileum ; and some imagine it to influence the duodenum, and especially the mouths of the biliary ducts, causing an increased flow of bile ; stimulating the intestinal canal, when that secretion is suspended as in jaundice. Its emmenagogue influence is attributed by some to a sympathetic extension of this irritation from the rectum to the uterus ; but there is no doubt that it exerts a direct influence on this organ, independent of the intestinal irritability. It is said that one to three grains of extract of hyoscyamus, or hops, or two grains of ipecacuanha, mixed with the aloetic dose, will prevent its irritating effect on the lower intestines. An increase of the quantity of aloes beyond the medium dose, is not attended by a corresponding increase of effect. Aloes has been efficacious in constipation, dyspepsia, and ascarides ; in this last instance, being used

in form of injection, ten grains to three ounces of water, for children. In chlorosis and amenorrhea it has often proved serviceable, and is used for this purpose, in various combinations. In cases of delicate females, with loss of appetite, torpor of the bowels, and suffering with suppression of the menses, the following has been recommended for the purpose of exciting proper ovarian or uterine action: Take of best aloes, pulverized, asafoetida, pulverized, of each, half a drachm, cantharides, pulverized, twenty grains; mix and rub well together with a little soap, and divide into twenty pills. Of these give from one to three, three times a day. If the patient be very feeble, some of the salts of iron may also be added. Injections of aloes, composed of from ten to thirty grains dissolved in two or three fluidounces of water, and thrown up the rectum daily, and continued for a week previous to the menstrual period, have sometimes proved effectual.

Aloes should never be given in inflammatory diseases, in irritable, plethoric habits, in gastritis, enteritis, where piles are present, to females liable to sudden uterine evacuations, nor during pregnancy. In hemorrhoids it may be given when modified by combination. Soap, or an alkaline carbonate, lessens its irritant action. The union of other purgatives with aloes, often modifies its tendency to irritate the rectum. One grain of aloes with two or three grains of sulphate of iron, will also modify this action, and will produce as much effect as two or three grains of aloes. As a cathartic, aloes will be found useful in habitual constipation from intestinal torpor, jaundice, scrofula, hypochondriasis, and where there is a tendency to cerebral congestion. Dose of aloes, is from two to ten, or even twenty grains; and the most convenient form of administration is that of pill. It enters as a constituent into a great number of useful compound remedies.

Off. Prep.—Decoctum Aloës Compositum; Enema Aloës Composita; Extractum Colocynthis Compositum; Pilulæ Aloës Compositæ; Tinctura Aloës; Tinctura Aloës et Myrrhæ.

ALOËSIN.

Bitter Extractive of Aloes.

Preparation.—Exhaust powdered Aloes with cold water; evaporate the infusion one-half; add an excess of acetate of lead, which precipitates the gallate, ulmate and albuminate of that metal; pour into the clear liquor solution of ammonia, which gives a yellowish-orange colored precipitate, consisting of oxide of lead combined with Aloësin, and which must be separated and washed with boiling water, and then decomposed

by a current of sulphureted hydrogen, but out of contact with atmospheric air. Sulphuret of lead is deposited, and a colorless liquid floats above it, which must be decanted, and evaporated in vacuo.

History.—Thus prepared, Aloësin is in colorless, or pale-yellow scales, like a varnish, without any sign of crystallization, of a powerful aloetic taste, soluble in cold water, alcohol, and especially weak spirit, sparingly soluble in ether, and not at all in fixed or volatile oils. Its aqueous solution, when exposed to the air, owing to oxidation, becomes dark-red; it is not precipitated by iron salts, acetate of lead, isinglass solution, or infusion of galls. Heat, exposure, and moisture convert it into an insoluble, inert oxygenated extract.

Properties and Uses.—Same as aloes. Eight grains of aloësin being equal to ten of Socotrine, and fifty of Cape aloes.

ALOÏNE.

The Purgative Principle of Barbadoes Aloes.

Preparation.—Pulverize the aloes with sand, and then treat it with cold water; strain off the liquid, and evaporate it in vacuo to a syrupy consistence—set it aside for a few days, when it will be filled with a mass of brownish-yellow granular crystals. This is impure Aloïne. To remove the brown matter associated with it, re-crystallize it repeatedly from warm water, until the crystals are of a sulphur-yellow. In making these solutions, the temperature of the water should not exceed 150° F. At 212° Aloïne oxidizes rapidly, and is decomposed.

History.—When pure, it crystallizes in stellated groups of small prismatic needles, whose purity is shown by the color, which should not deepen by exposure to the air in desiccation. It is completely neutral, sparingly soluble in cold water, but readily in warm, with a taste, at first sweetish, but soon becoming intensely bitter. Its solutions in the alkalies and their carbonates is of an orange-yellow, and the liquid absorbs oxygen upon contact with the atmosphere, which rapidly deepens its color. Boiled with alkalies or acids, it is speedily transformed into a brown resin. Corrosive sublimate, nitrate of silver, or neutral acetate of lead, do not cause its precipitation; concentrated subacetate of lead produces a precipitate of an intense yellow, soluble in excess of water, and becoming deeper colored on exposure. Cold fuming nitric acid dissolves it, without disengaging gas, forming a reddish-brown liquid; to which, if sulphuric acid be added in great excess, a yellow pulverulent body is thrown down, which explodes when heated. By dry distillation, aloïne furnishes a slightly aromatic, volatile oil, and a quantity of resinous substance. It forms crystallized compounds with bromine; but not

with chlorine, although it combines equally well with this latter. Bromine, added to a cold aqueous solution of aloïne, instantly forms a yellow precipitate, while the supernatant liquid assumes a very acid reaction, consequent upon the formation of hydrobromic acid. By dissolving the precipitate in warm alcohol, and cooling the solution, bromated aloïne is obtained in brilliant yellow needles, grouped in stars.

Properties and Uses.—Same as aloes. Dose of aloïne, one-fourth of a grain to a grain.

ALPINIA CARDAMOMUM.

Cardamom.

Nat. Ord.—Zingiberaceæ, *Lindley*. Scitamineæ, *Brown*. *Sex. Syst.*—*Monandria Monogynia*.

THE FRUIT. CARDAMOM SEED.

Description.—*Alpinia Cardamomum* has a tuberous horizontal root or rhizoma, with numerous fleshy fibers, and sending up from eight to twenty erect, simple, smooth, jointed, green and shining, perennial stems, which rise from six to ten feet in height, and bear alternate, spongy, sheathing, leaves. The leaves are bifarious, subsessile on their sheaths, elliptical-lanceolate, fine-pointed, somewhat villous above, sericeous underneath, entire, with strong midribs, and short footstalks, from one to two feet long, and from one to five inches broad. The sheaths are slightly villous, with a rounded ligula rising above the mouth. There are from three to five scapes proceeding from the base of the stem, which are from one to two feet long, lying upon the ground, flexuose and jointed; the branches or racemes alternate, one from each joint of the scape, sub-erect, and two or three inches long. Bracts solitary, oblong, smooth, membranous, striated, sheathing, one at each joint of the scape. Flowers alternate, short-stalked, solitary at each joint of the racemes, opening in succession as the racemes lengthen. Calyx monophyllous, funnel-shaped, three-toothed at the mouth, about three quarters of an inch long, striated with fine veins, permanent. Tube of corolla slender, as long as the calyx; limb double, exterior of three, oblong, concave, nearly equal, pale greenish-white divisions; inner-lip obovate, much longer than the exterior divisions, somewhat curled at the edge, with the apex slightly three-lobed, marked chiefly in the center with purple violet stripes. Filament short, erect. Anther double, emarginate. Ovary oval, smooth. Style slender. Stigma funnel-shaped. Capsule oval, somewhat three-sided, size of a small nutmeg, three-celled, and three-valved; seeds pale-brown, coriaceous, numerous.

History.—This plant is a native of the mountains of Malabar, growing spontaneously in the forests after the removal of the undergrowth. The fruit, which is the officinal part, is not obtained until at the end of the fourth year; it is a three-celled capsule, containing numerous seeds. The seeds constitute about 74 parts by weight in the hundred of the fruit or capsules received in commerce. They are small, irregular, angular, rough, of a brown color, and are easily pulverized; their odor is fragrant, and their taste warm, slightly pungent, and highly aromatic. The capsules are from three to nine lines long, three-sided with rounded angles, ovate-oblong, of a yellowish-white color, and three or four lines in thickness; they are commonly rejected, although they are slightly aromatic. Water or alcohol extracts the virtues of the seed, which contain a volatile oil, of an agreeable, penetrating odor, and a strong aromatic, camphoraceous, slightly bitter taste. Its specific gravity is 0.945. It undergoes a change, soon becoming deprived of its odor and taste. The oil obtained by percolation of ether through the powdered seeds, and evaporation of the ether, is of a light greenish-brown color, consists of volatile and fixed oils, and keeps better than the oil procured by distillation. The seeds should be allowed to remain in the capsules until wanted, as by this means their aromatic properties are the best preserved.

Properties and Uses.—Cardamom seeds are aromatic, stomachic, and carminative, chiefly used in flatulency, and as an adjuvant or corrective in compound preparations. Dose from ten grains to two drachms.

Off. Prep.—Syrupus Stillingiæ Compositus; Tinctura Cardamomi; Tinctura Cardamomi Composita.

ALTHÆA OFFICINALIS.

Marsh-Mallow.

Nat. Ord.—Malvaceæ. *Sex. Syst.*—Monadelphia Polyandria.

THE ROOT.

Description.—*Althæa officinalis* is a herbaceous, perennial, hoary green herb, peculiarly soft and downy, with fine starry pubescence, and having a tap-shaped, rather woody, perpendicular branching root. The stems are several, erect, from two to five feet in height, simple, round, branched and leafy toward the summit, and tough and pliant. The leaves are alternate, petiolate, nearly cordate at the base, oblong-ovate and obscurely three to five-lobed above, various in breadth, plaited, five-ribbed, unequally serrated, somewhat angular, soft and pliable, and clothed on both sides with a soft velvety down. The flowers are terminal, in very short, dense axillary panicles, rarely solitary, and of a delicate, uniform, blush color. The corolla has five spreading, obcordate

petals, of a pale-purplish color ; the *fruit* consists of numerous capsules united in a compact circular form, each containing a single seed.

History.—This plant grows in salt marshes and wet situations in many parts of Europe, and has been cultivated in several parts of this country. It flowers from July to September. Our shops are supplied nearly exclusively from Europe. The whole plant abounds in mucilage. The root is in pieces of three, four or more inches in length, round, nearly as thick as the finger, sometimes split, white, downy, with a peculiar faint smell, a mild, mucilaginous, sweetish taste, and a short, somewhat fibrous fracture. It contains a large proportion of mucilage, which is extracted by cold or hot water, and the solution decomposes if allowed to stand any great length of time. Those pieces which are plump and but slightly fibrous should be preferred, while those should be rejected which are woody, moldy, discolored, of a sour or musty smell, or of a sourish taste.

The *Hibiscus Palustris*, (or *H. Moscheutos*) Marsh Hibiscus, of this country, has a root very much resembling that of the Marsh-mallow, possesses exactly the same properties, and may be as effectually used. It is a tall, showy, perennial plant, growing in salt marshes, near salt springs, and on wet prairies, and flowers in August. The *stem* is simple, erect, herbaceous, round, downy, and from four to six feet in height. The *leaves* are from four to six inches, by three to four inches, often with two lateral lobes, ovate, obtusely dentate, and *hoary*-tomentose beneath. The *flowers* are larger than those of the hollyhock, rose-colored, purple in the center. *Peduncles* long, axillary, or connected with the petiole, usually distinct from it, but sometimes united with it, and jointed above the middle. *Styles* one inch longer than the stamens.

Properties and Uses.—The roots of each of the above plants are demulcent and diuretic, and may be used indiscriminately, the one for the other. They will be found valuable, in the form of decoction, in diseases of the mucous membranes, as hoarseness, catarrh, pneumonia, gonorrhea, vesical catarrh, renal irritation, acute dysentery and diarrhea. In strangury, inflammation of the bladder, hematuria, retention of urine, some forms of gravel, and indeed in nearly every affection of the kidney and bladder, their use will be found advantageous. I make much use of them combined with equal parts of spearmint, in urinary derangements. They are likewise efficacious in gastro-intestinal irritation and inflammation. Externally, they are very useful in the form of poultice, to discuss painful inflammatory tumors, and swellings of every kind; whether the consequence of wounds, bruises, burns, scalds, or poisons; and have, when thus applied, a happy effect in preventing the occurrence of gangrene. As a mucilaginous demulcent only, the *Althæa Rosea*, or hollyhock may be substituted.

Off. Prep.—Decoctum Althææ ; Infusum Althææ.

ALUMEN.

Alum. Sulphate of Alumina and Potassa.

History.—Official Alum is a double salt, consisting of the tersulphate of alumina, united with sulphate of potassa. It is occasionally manufactured from earths which contain it ready formed, but most generally from minerals called *Alum Ores*, the principal of which is the alum-stone. This is calcined and exposed to the air for three months, being frequently sprinkled with water, in order to soften it. Then it is lixiviated, and crystallized by evaporation.

Alum is a white, slightly efflorescent salt, crystallized in regular octohedrons, with a sweetish astringent taste. It dissolves in fourteen or fifteen times its weight of cold water, and three-fourths of its weight of boiling. It reddens litmus. When heated above 212° , it undergoes the aqueous fusion; and if the heat be continued, it loses its water, swells up, becomes a white, opaque, porous mass, and is converted into the official preparation called *Dried Alum*, (*Alumen Exsiccatum*). It is *incompatible* with the alkalies and their carbonates, lime and lime-water, magnesia and its carbonates, tartrate of potassa, and acetate of lead. Its specific gravity is 1.71.

Properties and Uses.—In ordinary doses of ten to twenty grains every three or four hours, in solution, syrup or molasses, it is astringent and antispasmodic. In larger doses of thirty to sixty grains every three or four hours, it is purgative, and every ten or fifteen minutes, emetic. As an astringent, it is used in passive hemorrhages, colliquative sweats, diarrhea attending typhoid fever, diabetes and chronic diarrhea and dysentery. Also, in gleet and leucorrhea, and by some during the inflammatory stage of gonorrhea, in solution with an infusion of marsh-mallow. In colica pictonum it has been highly extolled as a purgative; and is recommended as an emetic in pseudo-membranous croup. As an antispasmodic, it has been found useful in whooping-cough. In various anginous affections it has been successfully applied locally, in powder or solution, also as a gargle in sore-throat and relaxation of the uvula, as a wash for ptyalism, and as an injection in gleet and leucorrhea, alone or conjoined with sulphate of zinc. It has likewise proved very useful in purulent ophthalmia of infants, and in the latter stages of conjunctival inflammation. In colica pictonum it may be given in doses of from thirty to sixty grains, every three hours; in this disease it allays nausea and vomiting, relieves pain and flatulence, and opens the bowels with more certainty than any other medicine. It is frequently applied as a local styptic either in powder or solution, in epistaxis, menorrhagia, and to check the bleeding from cut surfaces; it may be applied on lint, or on a small piece of sponge if used in solution. From four to ten grains of alum to the ounce of water, is of sufficient strength for a collyrium.

I have found much advantage from the use of the following preparation in troublesome cough, especially when attended with tickling or irritation of the fauces, larynx, etc.:—Take of a saturated solution of alum, syrup of balsam of Tolu, each two fluidounces, camphorated tincture of opium one fluidounce; mix. The dose for an adult is a tablespoonful three or four times a day, or whenever the cough is very troublesome. Several practitioners to whom I have recommended the preparation, have found it very efficacious.

ALUMEN EXSICCATUM.—Dried or Burnt Alum, sometimes called *Alumen Ustum*, is prepared by heating alum, until ebullition ceases, and it becomes dry. It is principally used as a mild escharotic, to destroy fungous flesh. It differs from alum only in the absence of water.

ALUM WHEY, is made by boiling two or three drachms of powdered alum in a pint of milk, and then straining off the thin liquor. It may be given internally, in diarrheas, etc., in doses of from half an ounce to one or two ounces. Externally, applied over the eye as a poultice, it is very serviceable in inflammations of that organ.

Off. Prep.—Alumen Exsiccatum; Cataplasma Aluminis; Lotio Zinci Compositum; Pulvis Stypticus.

AMARANTHUS HYPOCHONDRIACUS.

Amaranth.

Nat. Ord.—Amaranthaceæ. *Sex. Syst.*—Monœcia Pentandria.

THE LEAVES.

Description.—*Amaranthus Hypochondriacus* is an annual herb, with a stout, upright stem, and growing from three to four feet high. The leaves are oblong, lanceolate, mucronate, green with a red-purple spot, or tinged with purple; flowers clustered in racemes, and of a bright-red purple, as well as the awl-shaped bracts. Racemes pentandrous, compound, erect, compact. Stamens five. The whole plant is dark-red, or reddish-purple, with long plume-like clusters.

History.—This plant, also known by the names of *Princes' Feather*, *Lovely Bleeding*, *Red Cocks-comb*, etc., is a native of the Middle States, and is cultivated as an ornamental plant in gardens. It bears deep bright-red flowers in August. The leaves, which are the parts used, are also red, and yield their virtues to water.

Properties and Uses.—Amaranth is astringent. The decoction drank freely is highly recommended in severe menorrhagia, and has also been found beneficial in diarrhea, dysentery, and hemorrhage from the

bowels. It has likewise been used as a local application in ulceration of the mouth and throat, in leucorrhea, and as a wash to foul, indolent ulcers.

AMBROSIA TRIFIDA.

Tall Ambrosia.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Monœcia Pentandria.

THE LEAVES.

Description.—Ambrosia Trifida is variously known by the names *Horseweed*, *Bitter-weed*, *Great Rag-weed*, *Horse-cane*, *Rich-weed*, etc. It is a rough, hairy, herbaceous, annual plant, with an erect, branching, furrowed *stem*, from five to ten feet in height. The *leaves* are opposite, from four to seven inches broad, scabrous and hairy, with three large, deep lobes which are oval, lanceolate, acuminate and closely serrated; the *lower leaves* are often five-lobed. *Petioles* narrowly-winged, ciliate; *racemes* often paniculate. *Flowers* mean and obscure, in long leafless spikes, axillary and terminal. *Fruit* (fertile involucre) turbinate-obovoid, with a short conical pointed apex, six-ribbed, the ribs terminating in as many cristate tubercles.

History.—This plant grows in low grounds and along streams, from Canada to Georgia, and west to Louisiana and Arkansas, bearing greenish-yellow flowers in August. It is much in use among farmers, for the “slabbers” in horses, effecting a cure in a few hours. It has a spicy, pleasant, aromatic taste, slightly resembling ginger, and imparts its properties to water.

Properties and Uses.—This plant is slightly stimulant, astringent, and antiseptic. Useful in decoction as an injection in leucorrhea, prolapsus uteri, chronic gonorrhea, and gleet; also valuable as a collyrium, in ophthalmia, and as a wash or gargle—with its internal use also—in the sore mouth of nurses. It will be found an excellent application to mercurial, and all other ulcers of a fetid or gangrenous character. As a remedy for mercurial salivation, used every half hour as a wash, it is said to be prompt and efficacious. Internally, the decoction is useful in fevers, attended with a disposition to putrescency, diarrhea, and dysentery. Dose of the decoction from one to two ounces. Two preparations are said to have been obtained from this plant, called *Ambrosine* and *Elatine*. The former, it is stated, is found associated with elatine, and forms beautiful and brilliant, pearl-like, prismatic crystals with sulphuric acid; it is tasteless and inodorous, and can be retained on the most sensitive stomach. It is recommended as a tonic, diuretic, and alterative in dropsical affections with great loss of vitality; in nephritis and

albuminuria; likewise in diabetes, consumption, scrofula, etc. Dose, one to three grains, three to six times a day. If this agent is as effectual as its manufacturers state, it will become one of the most valuable in the *Materia Medica*.—*Elatine* is obtained in the form of a white, flocculent precipitate. Properties and dose similar to ambrosine. We have not been able to learn the mode of preparing these articles.

The *AMBROSIA ARTEMISIÆFOLIA* (*A. Elatior*), Roman Wormwood, or Rag-weed, has a slender stem, rising from one to three feet high, much branched, and pubescent when young; the *leaves* are opposite, and the upper alternate, twice pinnatifid, smoothish above, paler or hoary beneath; *barren flowers* small, green, in terminal racemes, or spikes loosely paniced; the *fertile ones* sessile about the axils of the upper leaves; *fruit* obovoid, or globular, pointed, armed with about six short acute teeth or spines. It is sometimes called *Hog-weed*. It is very common in all our fields, and would probably prove fully as efficacious, if not more so than the *A. Trifida*. It is highly recommended as a fomentation in recent inflammation from wounds or injuries of any kind. Made into a salve by bruising the green leaves, and simmering them in spirits and cream, it is very useful in hemorrhoidal tumors, and some forms of ulcer.

AMMONIACUM.

Gum Ammoniac.

Nat. Ord.—*Apiaceæ.* *Sex. Syst.* Pentandria Digynia.

THE CONCRETE JUICE OF DOREMA AMMONIACUM.

Description.—The *Dorema Ammoniacum* has a large, perennial root, with stems rising from seven to ten feet high, about four inches in circumference at the base, clothed with a glandular down, smooth, glaucous, resembling *Opoponax*. The *leaves* are large, petiolate, somewhat bipinnate. *Pinnæ* in three pairs, each pair somewhat remote. *Leaflets* inciso-pinnatifid, with oblong, mucronulate, entire, or slightly-lobed segments, coriaceous. *Petiole* downy, very large, and sheathing at the base. *Umbels* proliferous, racemose; partial umbels globose, on short stalks, often arranged in a spiked manner. *General and partial involucre* wanting. *Flowers* sessile, immersed in wool. *Petals* white, ovate, reflexed at the point. *Margin of calyx* with five minute, acute, membranous teeth. *Disk* large, fleshy, cupshaped. *Stamens* and *styles* yellow, the latter complanate, recurved at apex. *Stigmas* truncate. *Ovary* very woolly. *Fruit* elliptical, compressed, with a broad flat edge; *mericarps* with three distinct, filiform, primary, dorsal ridges, and alternating with them are four obtuse, secondary ridges. *Villæ*, one beneath each secondary ridge, one beneath each of the broad marginal primary

ridges, and two on each side of the suture of the commissure, the external ones being very minute. The above description is gathered from those given by Don, Fontannier, and others.

History.—For a long time a knowledge of the plant which furnishes the Gum Ammoniac was a matter of doubt and uncertainty, but from specimens obtained in Persia, by Colonel Wright, and examined by Dr. David Don, it was ascertained to belong to a genus, *Dorema*, and not to the *Ferula*, as was formerly supposed, although somewhat allied to it. The *Dorema Ammoniacum* is an umbelliferous plant, growing spontaneously in various Persian provinces, in dry plains and gravelly soils. In the month of May, or in the early part of summer, it abounds in a milky juice, which flows out upon the slightest puncture. M. Fontannier states that it exudes spontaneously, and that the harvest is about the middle of June; but Captain Hart says that when the plant is mature, it is pierced in all directions by an insect of the beetle kind; the juice exudes through the punctures thus made, hardens upon the surface, and when dry is collected by the natives. It is still supposed, however, to be sometimes furnished by other and dissimilar plants of Asiatic as well as African growth.

Gum Ammoniac is not a pure gum, but a gum-resin; it comes to us in tears, or in aggregate masses, and is frequently mixed with foreign matters. The tears are the preferable parts to use; the purest are irregular in shape, more or less globular, opaque, yellowish externally, whitish internally, compact, homogeneous, brittle when cold, and breaking with a conchoidal shining fracture. The masses are darker, and of less uniform structure, and appear when broken, to be composed of numerous tears imbedded in a grayish or brownish substance. Ammoniac has a peculiar smell, which is stronger in the masses than in the tears; the taste is bitter, slightly sweetish, and somewhat acrid. Its specific gravity is 1.207. It softens by heat, and becomes adhesive, but does not melt; and when burned, it swells up, with a white flame, and emits a smoke of a strong, resinous, slightly alliaceous odor. It forms an opaque milky emulsion when triturated with water, but which becomes clear upon standing. It is partly soluble in alcohol, ether, vinegar, and alkaline solutions; the alcoholic solution is clear, but becomes milky on the addition of water.

Properties and Uses.—Stimulant and expectorant, and in large doses cathartic. Used in chronic catarrh, asthma, cough, and chronic pulmonary affections, where from debility of the vessels there is too large a secretion from the bronchial mucous membrane, or where expectoration is deficient. It has likewise been advised in chronic amenorrhea, especially when attended by hysterical or chlorotic conditions of the system. It is unsuited to inflammatory affections. Dose, ten to thirty grains in pill or emulsion. Externally, used in the form of plaster, as a discutient or resolvent in scrofulous tumors, tumors of the joints, indolent tumors, etc.

Gum Ammoniac enters into a cement for mending glass, china, etc., and which is useful to druggists, physicians, chemists, and others; it is called *Armenian Cement*, and *Diamond Cement*, and on account of its utility we give its mode of preparation. Take of isinglass two drachms, sprinkle it with water, and allow it to stand until softened, then add as much proof spirit as will rather more than cover it, and dissolve it with a moderate heat. Take of gum mastic one drachm, and dissolve it in two or three drachms of rectified spirit. Mix these two solutions, and stir in one drachm of gum ammoniac, which has been previously reduced to fine powder, and rubbed down with a little water. If necessary, evaporate in a water-bath to about the consistence of thick molasses, and keep it in a bottle. When required for use place the bottle in warm water, and allow the cement to soften, then apply it with a stick, or a small hard brush to the china or glass previously warmed. Compress the pieces firmly together until cold, taking care to make the contact perfect, and using a very thin layer of cement. When properly applied the cement is almost, if not quite, as strong as the china itself, unless exposed to the combined action of heat and moisture.

AMMONIA.

Ammonia.

History.—Ammonia was unknown to the ancients; it was discovered in a state of solution by Black in 1756, and in the pure gaseous condition by Priestley in 1774. All the ammoniacal compounds owe their distinctive properties to the presence of this gas, which is composed of one equivalent of nitrogen 14, and three of hydrogen 3, = 17. Its symbol is NH_3 ; its specific gravity is 0.59.

Ammonia may be obtained from any one of its salts by the process of single decomposition; but on account of its cheapness it is most generally obtained from the muriate of ammonia or sal-ammoniac, acted on by lime. The chemical changes that occur are disengagement of the ammonia, and a union of the lime with the hydrochloric acid, forming chloride of calcium and water. Under ordinary atmospheric temperatures and pressures ammoniacal gas is permanent; but at 50° , and under a pressure of six atmospheres, it is condensed into a colorless, very mobile liquid of the density of 760. It is transparent and colorless, like common air, but possesses a hot, acrid taste, and a highly pungent, suffocating odor; it is irrespirable, spasmodically closing the glottis when an attempt is made to inhale it, and irritates and inflames animal textures. It has a powerful alkaline reaction, turning reddened litmus paper purple, turmeric brown, and blue cabbage green. It combines readily with acid, forming crystallizable salts which are either sublimed or

decomposed by heat,—those with volatile acids being sublimed without change, while those with fixed acids part with their ammonia. In contact with a gaseous acid, the two gases unite, and solidify, forming a white powder. It is absorbed by alcohol, but more especially by water. Water of 59° F, at the atmospheric pressure of thirty inches absorbs 670 times its volume of ammonia. The salts of ammonia are divided into *hydracid salts*, in which it is supposed the hydrogen of the acid is transferred to the elements of the ammonia during the act of uniting; and *oxacid salts*, in which the acids combine with oxide of ammonium; this oxide is supposed to be formed by the union of the elements of one equivalent of water, (which is always contained in the oxacid salts of ammonia, and which cannot be separated without destroying their nature,) with the elements of one equivalent of ammonia.

Off. Prep.—Liquor Ammoniae; Liquor Ammoniae Acetatis; Liquor Ammoniae Fortior; Linimentum Ammoniae; Tinctura Castorei Ammoniata; Tinctura Guaiaci Ammoniaci; Tinctura Valerianae Ammoniata; Ammoniae Carbonas; Ammoniae Hydrochloras; Ammoniae Phosphas.

AMMONIÆ HYDROCHLORAS. (*Ammoniae Murias.*)

Chlorohydrate, or Muriate of Ammonia.

SAL AMMONIAC.

History.—Formerly, Sal-ammoniac was obtained from Egypt, where it was manufactured by subliming the soot resulting from the burning of camel's dung, which is used there as fuel. At present it is prepared in various ways, for instance, by the union of hydrochloric acid gas and ammoniacal gas; or by the double decomposition of sulphate of ammonia and muriate of soda. The sulphate of ammonia is obtained from various sources; sometimes by lixiviating the soot of coal, sometimes by decomposing with sulphuric acid the ammoniacal salts contained in the watery fluid which is formed in manufacturing coal gas, and sometimes by decomposing with sulphate of lime or sulphate of iron the impure carbonate of ammonia produced by the destructive distillation of animal refuse, but more especially in the preparation of animal charcoal from bones.

The hydrochlorate of ammonia which is consumed in the United States, is of foreign manufacture; the *crude* variety being imported from Calcutta; the refined from England. It is usually sold in thick cakes, convex on one surface, concave on the other, white, translucent, tough, fibrous, permanent in the air, no odor, but possessing a pungent, saline, acrid taste. It is composed of one equivalent of hydrochloric acid 36.42, and one of ammonia 17=53.42; or, in ultimate constituents,

of one equivalent of chlorine, one of nitrogen, and four of hydrogen. According, however, to the new view taken of the constitution of ammoniacal salts, it is the *protochloride of ammonium*, ($\text{NH}_4 \text{CL}$). Its specific gravity is 1.45. Three parts of cold, and one of boiling water, dissolves it, and cold is produced during its solution. Alcohol partially dissolves it. It is difficult to pulverize, which, however, may be effected by stirring a boiling saturated solution of the salt; as it cools, it granulates, and after being dried, is readily pulverizable. In a damp atmosphere it becomes moist. Heat sublimes without decomposing it. It is *incompatible* with the mineral acids, potassa and its carbonates, soda, lime, magnesia, acetate of lead, nitrate of silver, and most metallic salts whose base forms insoluble salts with muriatic acid.

Properties and Uses.—Internally, it is refrigerant, laxative, diaphoretic and diuretic; being purgative in large doses, but constipating in small ones. Its primary influence is exerted on the alimentary canal; its secondary, on the capillary, glandular, and lymphatic systems, as well as on the mucous, serous, and fibrous tissues, on all of which it acts as a stimulating alterative. In very large doses, it acts as a narcotic irritant, producing inflammation of the alimentary canal, and also coma and tetanic convulsions. It has been recommended internally in all tuberculous diseases, in chronic pulmonary affections, rheumatic face-ache, hemicrania, ischuria, chronic dysentery, amenorrhea the result of deficient uterine action, and in all chronic diseases of mucous or serous tissues. The dose is from five to thirty grains, every two or three hours, in powder, mixed with powdered gum, or sugar, or dissolved in syrup or mucilage.

Externally, muriate of ammonia employed in solution, has been found valuable as a stimulant and resolvent, in contusions, chilblains, indolent tumors and ulcers; and is of benefit in chronic ophthalmia, some forms of headache, itch, and many cutaneous affections. In erysipelas and erysipelatous inflammations, I have found the following mixture an excellent local application: Take of muriate of ammonia, one ounce, distilled water, half a pint; mix, and dissolve, then add tincture of camphor, four ounces, tincture of lobelia, four ounces. To be shaken each time previous to bathing with it. It allays the burning heat and itching, and in many instances assists in preventing the further development or extension of the disease. As a gargle, in the chronic form of cynanche tonsillaris, it is often serviceable, in solution; about one ounce of the salt to nine fluidounces of water, and one of alcohol, is of convenient strength. As a wash for ulcers, or as an injection in leucorrhœa, the solution must be still further diluted,—say from one to four drachms of the salt to a pint of water.

Off. Prep.—Ammoniæ Carbonas; Liquor Ammoniæ.

AMPELOPSIS QUINQUEFOLIA.

American Ivy.

Nat. Ord.—Vitaceæ. *Sex. Syst.*—Pentandria Monogynia.

BARK AND TWIGS.

Description.—This is a woody vine, with a rooting, climbing stem,—quinate and digitate leaves; leaflets, oblong, acuminate, petiolate, dentate, smooth, and turn crimson in autumn; flowers inconspicuous, greenish, or white, in dichotomous clusters; calyx entire; petals five, distinct, spreading; ovary two-celled, cells two-ovuled; style very short; berries dark-blue, acid, smaller than peas, and two-celled, cells one or two-seeded.

History.—The American Ivy is a common and familiar shrubby vine, climbing extensively, and, by means of its radicating tendrils, supporting itself firmly upon trees, ascending to the height of fifty feet; in the same manner it ascends and overspreads walls and buildings; its large leaves constituting a luxuriant foliage of dark glossy green. It is found in wild woods and thickets throughout the United States, and blossoms in July, ripening its small blackish berries in October. In various sections it has different names, as *Woodbine*, *Virginian Creeper*, *Five Leaves*, *False Grape*, *Wild Wood Vine*, etc. The bark and twigs are the parts used. It is considered a valuable remedy.

Properties and Uses.—Alterative, tonic, astringent, and expectorant. Used principally in form of syrup in scrofula, syphilitic affections, and wherever an alterative is required. It has also been recommended in bronchitis and other pulmonary complaints. Dose of the syrup or decoction, two to four ounces, three times a day.

Off. Prep.—Decoctum Ampelopsis; Infusum Ampelopsis.

AMYGDALA COMMUNIS.

Almond Tree.

Nat. Ord.—Drupaceæ, (*De Candolle*) Rosaceæ. *Suborder*, Amygdaleæ. *Sex. Syst.*—Icosandria Monogynia.

KERNELS.

AMYGDALA AMARA. *Bitter Almonds.*

AMYGDALA DULCIS. *Sweet Almonds.*

Description.—The Amygdalus Communis or Almond tree is a tree from fifteen to twenty feet high, with a pale-brown rugged bark, and

dividing into numerous spreading branches. The *leaves* are upon short footstalks, are about three inches long, and three quarters of an inch broad, lanceolate, acuminate, thin, veined, minutely serrated, with the lower serratures and petioles glandular, and of a bright light-green color. The *flowers* are large, pink or white, sessile, in pairs, and appearing before the leaves. *Calyx* reddish, with blunt segments. *Petals* variable in size, always much larger than the calyx, ovate, concave, irregularly notched. *Stamens* spreading, about half the length of the petals. *Ovary* woolly; *style* simple. *Fruit* a leathery, hoary drupe, with the sarcocarp spontaneously cracking and dropping off the putamen. *Stone* oblong, or ovate, acute, hard in various degrees, always rugged, and pitted with irregular holes. *Seed* oblong, compressed, ovate, with a brown testa, at the apex of which there is a broad round brown chalaza. *Cotyledons* very large, plano-convex. Both the sweet and bitter almonds are taken from this tree, of which there are several varieties,—the sweet almond is obtained from the *A. Dulcis*, and the bitter almond from the *A. Amara*.

History.—The Almond tree is a native of most of the warm parts of Asia, and Barbary, and is cultivated in many parts of southern Europe. The best of the sweet kind come from Malaga. The kernel of the sweet almond is inodorous, farinaceous, and of an agreeable taste; that of the bitter almond is also inodorous when entire; but when triturated with water, has the odor of prussic acid, and the taste resembles that of the peach kernel. Both varieties of kernel contain oil; the *sweet*, a fixed oil; the *bitter* a fixed oil, and an essential oil impregnated with hydrocyanic acid. The fixed oil may be obtained by expression; it is colorless or slightly yellowish, sweet and bland to the taste. The essential oil may be obtained from the bitter almonds by distillation with water, after having deprived them of their fixed oil. This oil, called Oil of Bitter Almonds, is of a yellowish color, heavier than water, with an acrid, bitter, burning, taste, and the odor of hydrocyanic acid; it is soluble in alcohol or ether, slightly soluble in water, and deposits on standing, crystals of benzoic acid. This oil does not pre-exist in the almond, but is formed by the action of water on some of its constituents, termed *emulsin*, and *amygdalin*; the latter is a crystalline substance peculiar only to the bitter almond. Oil of bitter almonds is a most active poison, acting as rapidly as hydrocyanic acid, and giving rise to the same symptoms. It is seldom used as a medicine, but is largely employed by perfumers, confectioners, and cooks, who prepare from it an “essence of almonds,” which is a solution of two drachms of the oil in six drachms of alcohol.

A potassa soft soap, made with lard and perfumed with essential oil of almonds is sold as a shaving soap, under the name of *Saponaceous Cream of Almonds*. It is made by melting fine clarified lard, seven

pounds, in a porcelain vessel, by means of a salt-water bath, or a steam heat under fifteen pounds pressure; then run into it, *very slowly*, potassa ley, containing about twenty-six per cent. of caustic potassa, three pounds and twelve ounces, agitating continually from right to left during the whole time. When about half the ley is run in, the mixture begins to curdle; it will, however, finally become so firm and compact that it cannot be stirred, if the operation is successful. The soap is now finished, but is not pearly; it will, however, assume that appearance by long trituration in a mortar, gradually adding rectified spirit two ounces, in which has been dissolved, essential oil of almonds two drachms.

Properties and Uses.—*Sweet almonds* are demulcent, and are chiefly used in emulsion, and as a vehicle for other medicines. The oil or emulsion has been employed in cough, diseases attended with intestinal irritation, and for mitigating the acrimony of the urine in calculous affections, cystitis, gonorrhea, etc. Externally, the oil is sometimes used in lotions and cosmetics. Dose of the oil, one to two drachms. *Bitter almonds* are sedative, and in large doses poisonous. The oil of bitter almonds, or bitter almond water, is commonly employed, and may be used as a substitute for hydrocyanic acid. Dose of the oil, one quarter of a drop to one drop, gradually and cautiously increased. Seldom used.

Off. Prep.—Aqua Amygdalæ Amara; Mistura Copaibæ Composita; Oleum Amygdalæ.

AMYGDALUS PERSICA.

Peach.

Nat. Ord.—Rosaceæ. *Drupaceæ*, De Candolle. *Sex. Syst.*—Icosandria Monogynia.

LEAVES AND KERNELS.

Description.—Amygdalus Persica, or Peach tree, is familiar to almost every one. It is supposed to be originally a native of Persia. The *leaves* are lanceolate, serrate, with all the serratures acute; *flowers* solitary, subsessile, appearing before the leaves, rose-color, with the odor of hydrocyanic acid; *drupe* fleshy, tomentose, yellowish, tinged with purple; *calyx* five-cleft, tubular, deciduous; *petals* five; *nucleus* somewhat compressed, ovate, acute, rugosely furrowed, and perforated on the surface.

History.—The peach tree is cultivated in all parts of the United States, where the character of its fruit attains to greater perfection than in any other country. Its height is from eight to fifteen feet, its fruit is

large, being from one to three inches in diameter, juicy, abounding in saccharine matter, and of a delicious flavor. The leaves are from three to five inches long, about one-third as wide, smooth, green, petioles short, with one or two glands. There are about two hundred varieties of this fruit, of which, probably, one-third are *clingstones*, the flesh adhering to the stone, and the remainder *freestones* or *clearstones*, the flesh free, or separating from the stone. The kernels of the fruit bear a strong resemblance to bitter almonds, in appearance, properties, and probably chemical nature; and, together with the leaves, flowers, and bark, have also their peculiar odor and taste, and would very likely yield hydrocyanic acid. The leaves afford a volatile oil by distillation.

Properties and Uses.—Peach leaves are sedative, laxative, and reputed anthelmintic. In all inflammations of the stomach and abdomen, they exert a decidedly beneficial influence when used in cold infusion, a tablespoonful every hour or two. In whooping-cough, irritable bladder, sick stomach, ischuria, hematuria, and dysentery, they have been found useful. The kernels are similarly employed in the form of tincture, infusion, or syrup; four ounces of the kernels to a quart of brandy is asserted to form a powerful tonic in intermittent fever, and to be remarkably efficacious in curing leucorrhœa; dose, a teaspoonful three or four times a day. Both leaves and kernels are said to contain hydrocyanic acid.

Off. Prep.—Infusum Persicæ.

AMYLUM.

Starch.

THE FECULA OF THE SEEDS OF TRITICUM VULGARE.

History.—Starch is a principle contained in various organs of many plants, as wheat, rye, barley, oats, rice, peas, beans, chestnuts, acorns, potato, etc.; and is extracted from many of them for dietetic and medicinal purposes, under the several names of Starch, Arrow-root, Tapioca, Tous-les-mois, and Sago. It abounds especially in the different kinds of grain, among which, wheat, yields one of its purest varieties, and from which an average of about from fifty to sixty per cent. is to be had. In preparing starch from wheat-flour, the flour, which consists of starch, gluten, mucilage, albumen, several salts, and some bran, is kneaded in a cloth with successive portions of cold water. The gluten and bran remain in the cloth; the mucilage, albumen, and salts dissolve in the water; and the starch passing away with the water in a state of suspension, gradually falls to the bottom. By allowing the albumino-mucilaginous water, from which it has subsided, to undergo fermentation, the starch is

thereby purified from the gluten; for the acetic acid formed during this process, dissolves the gluten.

Starch is of the purest white, pulverulent, opaque, nearly inodorous, and tasteless, and is usually had in small, columnar, irregular prisms. Its specific gravity is 1.53. In dry air it is permanent; in moist air it absorbs about twenty-four per cent. of water, without losing its dry appearance, and which may be driven off by a gentle heat. In its ordinary state it contains about twelve per cent. of moisture. It is insoluble in alcohol, ether, oils, and cold water. Alcohol removes from it a trace of essential oil, on which its odor and taste depends. Diluted sulphuric acid resolves it into sugar; nitric acid into malic and oxalic acids. When starch has been triturated or agitated with water, a dark purple compound is formed; a solution of starch made with hot water, and subsequently cooled, yields on the addition of iodine, an immediate deep-blue precipitate of iodide of starch; thus iodine is the most delicate test of its presence in any mixture. The color varies with the proportions employed; when the two substances are about equal, the compound is of a beautiful indigo-blue; if the iodine is in excess, it is blackish-blue; if the starch, violet-blue. A solution of iodide of starch, when heated to 200° , becomes colorless, but on cooling recovers its blue color; boiling permanently destroys the color. Alkalies form soluble compounds with starch, from which it may be precipitated by acids. Lime-water, and baryta-water, precipitate it from its solution, forming insoluble compounds. When starch is roasted, it is converted into a substance soluble in cold water, called *British Gum*, which may be applied in the arts to the same purposes as gum.

Starch consists of organized granules, of various form and size, being small, globular, oval, or angular. These granules have each a thin exterior pellicle or tegument, insoluble in water, and an interior, soluble substance. *Amylin* is the name applied to the external tegument; *amidin*, to the interior mucilaginous portion. *Dextrin* is amidin rendered impure with variable proportions of starch-sugar, and starch-gum—and may be prepared by boiling the starch for a long time in dilute sulphuric, muriatic, or oxalic acid; and if the boiling be still further continued, a saccharine substance is produced, similar to the sugar of grapes. *Diastase* is a principle developed in the seeds of barley, oats, wheat, etc., by germination. Starch consists of carbon, 44, hydrogen, 6.22, and oxygen, 49.78; its formula is $C_{12} H_{10} O_{10}$.

Properties and Uses.—Starch is demulcent and nutritive. It is used in mucilage, or in emulsion, for suspending drugs, when to be given internally or by injection. The powder is dusted upon the skin to absorb irritating secretions; to prevent excoriation; to soothe the pain of erysipelas, and to prevent intertrigo in infants. Starch may be used as an antidote to iodine.

ANACYCLUS PYRETHRUM.

Pellitory of Spain.

Nat. Ord.—Compositæ, (Decandolle) Asteraceæ, (Lindley). *Sex. Syst.*—Syngenesia Superflua.

ROOT.

Description.—This is the *Anthemis Pyrethrum* of Willdenow, and of the U. S. Dispensatory, the name of which has been changed by De Candolle, and the plant placed into a new genus on account of a difference in the structure of its seeds. Its *stems* are numerous, procumbent, somewhat branched, pubescent. *Radical leaves* spreading, petiolated, smoothish, pinnately divided; the segments much cleft into linear, subulate lobes; *cauline leaves* sessile. *Branches* one-flowered. *Receptacle* convex, with oblong-obovate, obtuse paleæ. *Florets of the disk* are yellow; the *rays* are white on their upper surface, and reddish or purple beneath and at their edges.

History.—Pellitory of Spain, or Spanish Chamomile is a native of the Levant, Arabia, Syria, and the South of Europe. The root is the official part, and as found in the shops it is about the size of the little finger, cylindrical, straight, or but slightly curved, wrinkled longitudinally, of an ash-brown color externally, whitish within, hard and brittle, and sometimes furnished with a few radicles. It is inodorous, though when recent it possesses a very disagreeable smell; when chewed it produces a peculiar sense of heat, pungency and tingling in the mouth, which lasts for some time, and which is attended with a copious flow of saliva. Analysis gives a brown, very acrid substance, of a resinous appearance, which is insoluble in caustic potassa; a dark brown, very acrid, fixed oil, soluble in potassa, a yellow acrid oil, traces of tannin, gum, inulin, and various salts. Alcohol or ether dissolves its active principle.

Properties and Uses.—Irritant and sialagogue. Used in neuralgic affections of the head and face, toothache, paralysis of the tongue, and of the muscles of deglutition. The tincture makes a good rubefacient and odontalgic remedy.

ANAGALLIS ARVENSIS.

Red Chickweed.

Nat. Ord.—Primulaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES.

Description.—Anagallis Arvensis is a beautiful annual trailing plant, in fields, roadsides, etc., introduced into this country from Europe. Its

stem grows from six to twenty inches long, with elongated branches, or simple, often dotted with purple, square, and more or less procumbent. The *leaves* are sessile, ovate, many-ribbed, opposite or ternate, dotted with purple at the back; *peduncles* longer than the leaves; *sepals* linear-lanceolate, about equaling the petals; *petals* obovate, obtuse, longer than the stamens, crenate-glandular. *Flowers* opposite, small but beautiful, with scarlet petals, opening at 8 o'clock, A. M., and closing at 2, P. M.; in damp weather not open at all. *Stamens* purple, hairy, dilated, and smooth at the base. *Anthers* yellow, heart-shaped. *Style* purple, permanent. *Stigma* capitate. *Capsule* pale and transparent, the size of a pea, separating all round, the valves marked with some indications of longitudinal separations which seldom take effect. *Seeds* roughish, abrupt externally, each with a central dot.

History.—This plant has several names, as *Red Pimpernel*, *Poor Man's Weather Glass*, *Scarlet Pimpernel*, etc. It blossoms in June and July. The leaves are the parts used, they are inodorous, but have a bitter, somewhat acrid taste. Water extracts their virtues. The plant appears to possess energetic properties, for Orfila destroyed a dog by making him swallow three drachms of the extract; it inflamed the mucous membrane of the stomach. Grenier obtained a similar result.

Properties and Uses.—The precise properties of this plant are not fully known. It was formerly esteemed as a counter poison, and has been used as a preventive of hydrophobia. Its internal use has been recommended in visceral obstructions, dropsy, mania, epilepsy, delirium, and other nervous diseases; also in febrile delirium. But too little is known of its action to warrant its indiscriminate employment in these diseases. It may, however, be used in form of poultice, as a local application to old and ill-conditioned ulcers.

ANAMIRTA COCCULUS.

Cocculus Indicus.

Nat. Ord.—Menispermaceæ. *Sex. Syst.*—Dioecia Dodecandria.

THE FRUIT.

Description.—*Anamirta Cocculus*, formerly called according to Linæus, *Menispermum Cocculus*, is a strong, climbing shrub, with a corky, ash-colored bark, with deep cracks or fissures; the *leaves* are thick, smooth, shining, coriaceous, roundish, acute, very slightly cordate, if at all, sometimes truncate at the base, with five digitate ribs, about six inches long, and as many broad; *stalks* a little shorter than the leaves, tumid at both ends, especially the lower. *Flowers* dioecious; *female*

flowers in lateral compound racemes. *Calyx* of six sepals in a double series, with two closely-pressed bractioles. *Corolla* none. *Stamens* united into a central column dilated at the apex. *Anthers* numerous, covering the whole globose apex of the column. *Drupe*s, one to three, globose, one-celled, one-seeded. *Seed* globose, deeply excavated at the hilum. *Albumen* fleshy. *Cotyledons* very thin, linear-oblong, distant, diverging, very membranous.

History.—This plant is a native of the Malabar coast, and of eastern insular and continental India. The parts used are the berries or fruit, which, as found in the shops, are round, subreniform, about the size of a pea, inodorous, of a grayish-black color, and composed of an external, thin, hard, brittle shell, covering another, which is white, and still denser, and contains a white nucleus divided by a central placenta. They are inodorous, but have an intensely and permanently bitter taste. They contain *picrotoxin*, or *picrotoxic acid*, which is a very bitter, poisonous principle, *menispermin*, an alkaline principle, paramenispermin, hypopicrotoxic acid, fixed oil, etc.

Properties and Uses.—Poison. Given to animals it acts on the cerebro-spinal system, causing nervous tremors, convulsions, and tetanus; it also acts on the stomach as a local irritant. It is never used internally, but has been applied externally in form of powder or ointment, in some obstinate cutaneous affections, tinea capitis, and for the destruction of vermin in the hair. It is sometimes used to stupefy fish in order that they may be caught, and it is asserted that the fish thus taken are not poisonous. It is likewise added to malt liquors to render them bitter and intoxicating, but which is highly improper and dangerous.

ANDIRA INERMIS.

Cabbage-tree Bark.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Diadelphia Decandria.

THE BARK.

Description.—*Andira Inermis*, (*Geoffroya Inermis*), is a tree of moderate height, branched toward the top, and covered with a smooth gray bark; the *branches* are suberect at their extremities, terete, glabrous, ash-colored. The *leaves* are about a foot in length, alternate, unequally pinnate, consisting of five to eight pairs of oblong-lanceolate, acuminate, veined, smooth *leaflets*, of a dark-green color, on short roundish ferruginous downy stalks, with a terminal one on a longer footstalk. The *flowers* are rose-colored, large, branched, and arranged in erect, axillary, terminal downy panicles, with very short pedicels. The *calyx* is turbinate-campanulate, covered with ferruginous down, of a dark-purple

color, and divided into five obtuse segments. The *corolla* is of a pale-rose color, papilionaceous, having a concave vexillum, emarginate at the top, and longer than the carina. The *stamens* are purple, diadelphous, with roundish anthers. The *ovary* is oval, with a tapering, curved style, and hooked stigma. The *fruit* resembles a small plum, is pulpy, and contains a hard nut, or legume.

History.—This tree is a native of Jamaica and other of the West India Islands. The bark is the officinal part; it is in long, thick, fibrous pieces, externally of a brownish-ash color, and generally covered with lichens, and internally yellowish. It has a resinous fracture, a disagreeable smell, and a sweetish, mucilaginous, bitterish taste.

Properties and Uses.—Cabbage-tree Bark is emetic, purgative, and anthelmintic. It is thought by some to be a dangerous acro-narcotic in large doses, causing troublesome sickness, fever, and delirium; on which account it is not much used in practice, although it has proved effectual in removing the lumbricoid worms. Dose of the powdered bark, from a scruple to a drachm; of the extract three grains; of the syrup or decoction, a teaspoonful two or three times a day. If any narcotic or other unpleasant effects arise, a dose of castor-oil must be administered, and the patient must take freely of lime-juice.

ANDROMEDA ARBOREA.

Sorrel Tree.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—Andromeda Arborea is a tree growing from forty to fifty feet high, with a trunk from ten to fifteen inches in diameter. The *leaves* are oblong-lanceolate, acuminate, serrate, petiolate, deciduous, from five to six inches long, and from one to two inches broad, villous when young, at length smooth, with a distinctly acid taste, and early in autumn they turn bright scarlet. The *flowers* are pedicellate, secund, spreading, at length reflexed; *panicles* terminal, consisting of numerous spicate racemes. *Calyx* without bractlets. *Corolla* ovate-oblong, narrowed at the summit, five-toothed, pubescent externally. *Filaments* thickened; *anthers* awnless, the cells long and pointed; *capsule* pyramidal, pentangular; *seeds* ascending from the base, linear, with a loose coat taper-pointed at both ends; *bracts* and *bractlets* minute, deciduous.

History.—This is a beautiful tree, growing in the valleys of the Alleghany mountains, from Pennsylvania to Florida, and bearing white flowers in July. The leaves are the parts used; they have a very pleasant acid taste, and yield their properties to water.

Properties and Uses.—Sorrel Tree leaves are tonic, refrigerant and diuretic. A decoction of the leaves is a grateful refrigerant drink in fevers, and will also produce diuresis. Some species of the Andromeda are poisonous, as the *A. Ovalifolia*, *A. Polifolia*, *A. Mariana*, *A. Nitida*, and *A. Angustifolia*; the powder upon the leaves and buds of the *A. Speciosa*, and *A. Pulverulenta*, is a powerful errhine.

ANEMONE NEMOROSA.

Wood Anemone.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE PLANT.

Description.—Anemone Nemorosa, sometimes called *Windflower*, is a delicate and pretty plant, with a creeping root, and a simple, erect stem, with a single flower on a naked peduncle, and from six to nine inches high. The leaves are radical and ternate, and the leaflets undivided, or with the middle one three-cleft, and lateral ones two-parted, incisely dentate; involucre at the base of the flower-stalks, long petioled, divided into three, toothed, and cut: *sepals* four to six, oval, white, sometimes tinged with purple outside; *carpels* fifteen or twenty, ovate, with a short style, hooked. *Stamens* numerous, much shorter than the sepals; *ovaries* numerous, free, collected into a roundish or oval head.

History.—This plant is common to Europe and the United States, bearing purplish-white flowers in April and May. There are several varieties of it, which possess similar properties, as the *A. Patens*, of this country, the *A. Pratensis* and *A. Pulsatilla*, or Meadow Anemone of Europe. The last is probably the most active among them. The herbaceous part of the plant is employed in medicine. A volatile, crystallizable solid, called *Anemonine* is obtained from the various species of anemone, by distilling the plants with water, and setting the product aside; it crystallizes in brilliant white needles. Its formula is $C_2 H_2 O_2$. Alkalies convert it into anemonic acid. A solution of it has been used externally in scaldhead, ulcers, caries, indurated glands, venereal nodes, serpiginous affections, paralysis, amaurosis, cataract, and opaque cornea. Its internal use is questionable.

Properties and Uses.—These plants are acrid and poisonous. They have been recommended in amaurosis and other diseases of the eye, secondary syphilis, cutaneous diseases, and whooping-cough, in doses of one or two grains daily. When applied to the head, it is said to be a speedy cure for tinea capitis. In the recent state, the leaves bruised and applied to the skin are rubefacient. In large doses, this article produces

nausea, vomiting, looseness of the bowels, and bloody urine. It is very seldom applied in practice, except among the Homeopaths, who use the *A. Pulsatilla*.

ANGELICA ATROPURPUREA.

Purple Angelica.

Nat. Ord.—Umbelliferae or Apiaceae. *Sex. Syst.*—Pentandria Digynia.

ROOT, HERB AND SEED.

Description.—*Angelica Atropurpurea*, sometimes called *Masterwort*, *High Angelica*, etc., has a perennial, purplish root, and a smooth, herbaceous stem, hollow, glaucous, from one to two inches in diameter, and rising from three to six feet high; its dark purple color has given rise to its specific name. The *leaves* are ternate, and supported by very large inflated petioles. The *leaflets* are pinnate, five to seven, sharply cut-seriate, acute, pale beneath, the terminal one sometimes three-lobed, the lateral ones of the upper division decurrent. *Umbels* three, large, terminal, many-rayed, spreading, spherical, six to eight inches in diameter, without the involucre. *Umbellets* dense, subhemispheric, on angular stalks, and with involucels of subulate bracts longer than the rays. *Calyx* five-toothed; *petals* equal, entire, with the point inflected. *Involucels* short, about eight-leaved. *Fruit* smooth, compressed, somewhat solid and corticate, elliptic.

History.—This plant grows from five to eight feet high, throughout the United States, in meadows and marshy woods, and flowers in June and July; the flowers are greenish-white. The whole plant has a strong odor, and a warm aromatic taste. The juice of the recent root is acrid, and is said to be poisonous; drying dissipates much of this acrimony.

Properties and Uses.—Aromatic, stimulant, carminative, diaphoretic, expectorant, diuretic, and emmenagogue. Used in flatulent colic and cardialgia. It is said to promote the menstrual discharge. In diseases of the urinary organs, calculi and passive dropsy, it is used as a diuretic, in decoction with *uva ursi* and *eupatorium purpureum*. Dose of the powder, thirty to sixty grains; of the decoction, two to four ounces, three or four times a day. The *Angelica Archangelica*, *A. Triquinata* and *A. Lucida*, may be substituted for the above.

ANTENNARIA MARGARITACEUM.

Pearl Flowered Life Everlasting.

Nat. Ord.—Compositæ or Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE LEAVES.

Description.—*Antennaria Margaritaceum* is a perennial plant, with a simple, erect stem, corymbosely branched above; the *leaves* are linear-lanceolate, acute, three-veined, sessile, and beneath the stem woolly; *corymbs* many-flowered, fastigate; *scales* of the *hemispheric involucre* elliptic, obtuse, opaque, pearl-white, the outer ones only tomentose at the base. *Heads* diœcious; the *pistillate flowers* very slender; pappus simple, bristly, capillary in the fertile flowers, and in the *sterile* club-shaped or barbellate at the summit. Corolla yellowish.

History.—The name *Antennaria* is from the resemblance of the sterile pappus to the *antennæ* of many insects. The plant is slightly fragrant, and grows in dry hills and woods in various parts of the United States; it is from one to two feet in height, and bears yellow and white flowers in July. The leaves are the parts used.

Properties and Uses.—Anodyne, astringent and pectoral. A decoction has proved beneficial in diarrhea and dysentery, and in pulmonary affections. Used externally as a cataplasm in painful tumors, contusions and sprains, and is certainly very efficacious in relieving pain and disposing to sleep, often succeeding where the hop poultice has proved ineffectual. The *A. Plantagineum*, and *A. Dioicum*, or white plantain, are supposed to be beneficial in snake-bites.

ANTHEMIS NOBILIS.

Chamomile. Roman Chamomile.

Nat. Ord.—Compositæ Senecionideæ, or Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

FLOWERS.

Description.—This is a herbaceous plant with a strong, perennial root, having long fibers. The *stems* in a wild state are prostrate, in gardens more upright, from six to twelve inches long, branched, leafy, round, slender, hollow, furrowed, downy. The *leaves* are pale-green, bipinnate, sessile, with small, thread-like *leaflets* which are rather flat or channeled above, convex beneath, somewhat pubescent, acute, and generally divided into three segments. The *flower-heads* are terminal, soli-

tary, rather larger than a daisy, with a convex yellow disk, and numerous white, spreading, or reflexed rays. The *calyx* is common to all the florets, of a hemispherical form, and composed of several small imbricated hairy scales, with thin, membranous edges. The *receptacle* is conical or convex, prominent, and furnished with rigid bristle-like paleæ, one to each floret; the *scales of the receptacle* do not appear till the florets of the disk are turned to one side, and the innermost are gradually narrowest. The *florets of the ray* are usually about eighteen, narrow, ligulate, white, spreading, three-toothed; the *disk florets* are numerous, yellow, perfect, tubular, divided into five lobes. The *stamens* are five, very short. The *ovary* is obovate, and supports a slender style, with a bifid, reflexed stigma. The *seeds* are ovate, compressed, and slightly crowned.

History.—Chamomile is a native of Europe, and is extensively cultivated for medicinal purposes; by cultivation the flowers become double, but the properties are not so great in these as in the single flowers, because the disk contains the virtues in the greatest degree. The flowers which are the whitest are the best; the seeds yield a fixed oil by expression. As found in the shops, chamomile flowers are large, almost spherical, of a dull-white color, a fragrant odor, and a warmish, bitter, aromatic taste. By distillation they yield a volatile oil, at first of a pale, blue color, but which changes to yellow or brownish; its stimulant properties depend on this oil, and a resin; the tonic, on its bitter extractive; it also contains a small quantity of tannin. Schendler has obtained from the flowers a volatile acid in minute proportion, much resembling valerianic acid. Water or alcohol extracts their virtues; boiling water extracts nearly one-fourth of their weight.

Properties and Uses.—In small doses tonic, and in large, emetic. Used in cold infusion in dyspepsia, and in all cases of weak or irritable stomach; also in intermittent and typhus. A strong infusion, warm, and taken freely, acts as an emetic. The oil is carminative and antispasmodic. Used in flatulency, colic, cramp in the stomach, hysteria, nervous diseases, and in painful dysmenorrhea. Dose of the oil, five to fifteen drops, on sugar; of extract, prepared in vacuo, which is the best form for internal administration, one to three grains. The flowers of the *Matricaria Chamomilla*, or German chamomile, possess similar properties to the anthemis, but are rarely used in this country, except by German practitioners.

Off. Prep.—Extractum Anthemidis; Extractum Anthemidis Fluidum; Infusum Anthemidis; Oleum Anthemidis; Vinum Symphytii Compositum.

APIUM PETROSELINUM.

Parsley.

Nat. Ord.—Apiaceæ or Umbelliferae. *Sex. Syst.*—Pentandria Digynia.

ROOT.

Description.—*Apium Petroselinum*, *Willdenow*, or *Petroselinum Sativum*, *Hoffman*, has a biennial, fleshy, fusiform root, with an annual, round, furrowed, joint, erect, branching stem, striate with green and yellow lines, and rising from two to four feet in height. The *radical leaves* are compound, pinnated in ternaries, on long channeled stalks; the *leaflets* are rhomboidal-ovate, wedge-shaped at the base, deeply incised, with the segments mucronate, and sometimes rounded. *Upper leaves* gradually become more entire and narrower, till the uppermost are simply ternate with linear segments. *Umbels* terminal, axillary, pedunculated, and with five to eight rays. *General involucre* none, or one to two subulate minute bracts; *partial involucre* with six or eight setaceous bracts, much shorter than the pedicels, erect, forming a perfect whorl. *Flowers* white or greenish; petals rounded, incurved, scarcely emarginate; *calyx* with the limb obsolete; *disk* short, conical, somewhat crenulate; *styles* diverging. *Fruit* ovate, about a line long, compressed, pale greenish-brown, flat on one side, convex on the other, and marked with five longitudinal ridges. *Stamens* longer than the corolla.

History.—This plant is a native of Europe, but is cultivated in gardens throughout the civilized world. The whole plant has an aromatic odor, and the leaves are used for culinary purposes. The root, which is officinal, is fusiform and fleshy, with a pleasant smell, and sweetish taste; it should be used in the recent state. Its properties depend upon an essential oil, and are taken up by water, wine, alcohol, or ether.

Properties and Uses.—Diuretic. Very useful in dropsy, especially that following scarlatina, and other exanthematous diseases. Also, used in retention of urine, strangury, and gonorrhea. The seeds have a strong, terebinthinate odor, and a warm aromatic taste, and have been used as carminatives, and for the same purposes as the root—they are said to be a deadly poison to the parrot. The seeds, as well as the leaves, sprinkled on the hair, in powder, or in the form of an ointment, will effectually destroy vermin; the leaves, applied as a fomentation, will, it is asserted, cure the bites or stings of insects. The leaves, bruised, are a good application to contusions, swelled breasts, and enlarged glands—reputed to “dry up the milk” of wet-nurses. The oil is efficacious as a diuretic, in doses of three or four drops a day; dose of the infusion, two to four ounces, three or four times a day.

Off. Prep.—Infusum Petroselini.

APOCYNUM ANDROSÆMIFOLIUM.

Bitter-root.

Nat. Ord.—Apocynaceæ. *Sex. Syst.*—Pentandria Digynia.

ROOT.

Description.—*Apocynum Androsæmifolium* is an indigenous, perennial, herbaceous plant, with a large and bitter *root*, and an erect, smooth *stem* which rises from three to six feet high; it is simple below, repeatedly branching above, usually red on the side exposed to the sun, lactescent, and covered with a tough, fibrous bark. The *leaves* are opposite, petiolate, ovate, acute, entire, smooth on both sides, paler and very slightly pilose beneath, and two or three inches long. *Flowers* in loose, nodding, terminal or axillary cymes, white, tinged with red, monopetalous, campanulate, with five acute spreading segments. The *peduncles* are furnished with minute, acute bracts. *Calyx* small, five-cleft, much shorter than the tube of the corolla. *Stamens* five, with very short filaments, and long, sagittate, connivent anthers, cohering with the stigma about their middle, and often holding fast such insects as may thrust their proboscis between them. The *nectary* consists of five oblong glandular bodies, alternating with the stamens. *Ovaries* two, ovate, concealed by the anthers and supporting two thick, roundish, sessile stigmas. The *fruit* is in the form of a pair of slender, linear-lanceolate, drooping follicles, containing numerous oblong, imbricated seeds attached to a slender central torus, and each crowned with a long, downy pappus. Every part of the plant is lactescent.

History.—This plant, likewise called *Dogsbane*, *Milk-weed*, etc., is found in nearly all parts of the United States, from Canada to Carolina, growing in dry, sandy soil, on hill-sides, or in woods, flowering in June and July; when any part of it is wounded, a milky juice exudes. The root is the officinal portion, it is large, lactescent, and of a disagreeably bitter taste; the bark, which forms nearly two-thirds of it, is the active part. Analysis has discovered it to contain a bitter extractive, a red coloring matter soluble in water and not in alcohol, caoutchouc and volatile oil. It yields its properties to alcohol, but especially to water. Age impairs its virtues.

Properties and Uses.—Emetic, diaphoretic, tonic, and laxative; it has been found very valuable in the treatment of chronic hepatic affections, and in conjunction with *Menispermum* in dyspepsia and amenorrhea. In doses of forty to sixty grains it promptly induces emesis, with scarcely any previous nausea, and hence is useful where it is desired to evacuate the stomach, without producing that muscular relaxation incident to a long-continued nausea; however, it is said to occasion a

subsequent weakness or languor, from which the patient is some time in recovering. As a laxative, it is useful in cases of constipation, and in hepatic derangements. As a tonic, ten or twenty grains may be given to stimulate the digestive apparatus, and thus effect a corresponding impression on the general system. As a diaphoretic it must be combined with opium, in the proportion of one grain of the latter to forty of the former, and divided into three or four doses; however, as a diaphoretic, it is inferior. Also reputed useful as an alterative in rheumatism, scrofula, and syphilis. Prof. Gregory speaks of Apocynine as the active agent of the *A. Androsæmifolium*, but has given no method of preparing it. It is said to be very bitter, and of a dark orange color. Used as an alterative in syphilitic and scrofulous affections, in doses of half a grain to a grain; as a purgative, one grain to two grains. It has been beneficially employed in liver and stomach affections, intermittents, and the low stage of typhoid fevers.

I have used a preparation called *Apocynin*, prepared from this plant by Mr. J. B. Robinson of Cincinnati, Ohio, in jaundice, combined with leptandrin and myricin, with excellent effect, as well as in hepatic torpor, and constipation. It is a powder of a dark-brown color, possessing an odor similar to the root, and a bitter, nauseous, unpleasant taste. Mr. Robinson prepares it by neutralizing the saturated tincture of the root by ammonia, then filtering and precipitating the apocynin by sulphuric acid, which must be added gradually; when obtained it is to be washed in one or two waters, and then dried. One pound of the root yields about half an ounce of the dried apocynin, and much care must be taken in the operation, lest the whole be spoiled.

Off. Prep.—Decoctum Apocyni; Extractum Apocyni Hydro-Alcoholicum; Apocynin.

APOCYNUM CANNABINUM.

Indian Hemp.

Nat. Ord.—Apocynaceæ. *Sex. Syst.*—Pentandria Digynia.

ROOT.

Description.—In general appearance and character the *Apocynum Cannabinum* bears a close resemblance to the *Apoc. Androsæmifolium*. The root is perennial and creeping; the stems are erect, herbaceous, branching, of a brown color, and two or three feet in height. The leaves are opposite, oblong-ovate, acute at both ends, and somewhat downy beneath. The cymes are many-flowered, terminal and lateral, paniculate, smooth. The corolla is small, of a greenish or yellowish-white externally, with a tinge of pink or purple within, with a campanulate

tube not longer than the calyx. The *calyx* is about as long as the corolla, with subulate segments, lanceolate. *Follicles* long and slender. *Fruit* similar to *A. Androsæmifolium*.

History.—This plant is indigenous and grows in similar situations with the *Apoc. Androsæm.*, flowering about the same time. It likewise abounds in a milky juice, and has a tough, fibrous bark, which, by maceration, affords a substitute for hemp, but of a whiter color, and superior in strength and durability. A decoction of the plant affords a permanent brown or black dye, according to the mordant used. The root is the officinal part; when fresh it is of a dark-chestnut color, with a nauseous, somewhat acrid, and permanently bitter taste, and a strong, unpleasant odor. When dried it is brittle and readily pulverized, affording a powder somewhat resembling *Ipecacuanha*. The ligneous portion is yellowish-white, with some odor, and a decided bitter taste; the cortical part is brown externally, and white within, of a very bitter, nauseous taste. Analysis has ascertained it to contain tannin, gallic acid, gum, resin, wax, fecula, a coloring matter, caoutchouc, lignin, and a peculiar bitter principle to which the name of *Apocynin* has been proposed. The root yields its properties to alcohol, and more readily to water; its virtues are impaired with age. Every part of this plant, in the recent state, exudes a milky juice when wounded.

Properties and Uses.—Emeto-cathartic, diuretic, and diaphoretic. In a full dose it occasions much nausea, diminishes the frequency of the pulse, and has a tendency to produce drowsiness independent of the exhaustion consequent upon vomiting; copious vomiting soon ensues, and subsequently large and feculent watery stools. A general perspiration almost always follows. Its diuretic effects vary in different individuals, being very manifest in some and less so in others. Snuffed into the nostrils, the powder will excite sneezing.

As a hydragogue cathartic, and also as a diuretic in those instances where this effect is displayed, it has been found most useful in dropsy. In diaphoretic doses it has proved beneficial in intermittent and remittent fevers, and pneumonic affections. As an emetic, from fifteen to thirty grains of the powder, is the dose; as a hydragogue or diuretic, the decoction is the best form in which to employ it,—one ounce of the root may be boiled in a pint of water, of which a wineglassful may be given two or three times a day, or oftener if required. Smaller quantities of the decoction, given warm, will cause diaphoresis; as a purgative, the aqueous extract may be given in doses of from three to six grains. The *apocynin* obtained from this plant will probably be found identical in virtue and chemical constitution with that from the *A. Androsæmifolium*. Further investigations with it are required, before anything positive and satisfactory can be made known.

The Illustrated Chronicle.

GET BUSY NOW ON YOUR ALLOTMENTS.

Hints on Sprouting Potatoes: Don't Buy Unprofitable Seed: How to Arrange Seed Beds.

(By the Editor of the "The Small-holder.")

In our opinion tubers required for early planting are best sprouted in baskets or boxes. If properly constructed trays are available so much the better, for these, while admitting of being stacked one on top of the other, also ensure a free circulation of air and light, both of them essential conditions which are not so easily obtainable with ordinary boxes.

This does not apply, of course, in the case of herring boxes, which are excellent, and can be purchased very cheaply. The only drawback is that they smell strongly of the fish, so there are somewhat objectionable in the house; but where there is an outhouse or shed we advise their use instead of trays.

The packing of the tubers in the boxes can best be performed when the box is slightly tilted: By the way, too, when placing the tubers in the boxes see that the growing ends of the tubers—that is, the ends where "eyes" are prominent—are placed uppermost.

WHAT ARE THE BEST "SETS" ?

Now, regarding the kind of sets to choose. Some people think that the "late" pig potatoes, or refused, are good enough, but we do not agree with them. On the contrary, the best, and not the worst, ought to be used.

If any very large tubers are planted, they should be divided or cut so that each portion has at least two sprouts. As these large potatoes have different degrees of size and development, no definite rule can be laid down as regards cutting, except to say that the cuttings should proceed from the crown downwards. This secures for each set a good proportion of vigorous sprouts.

A common mistake which many make is to cut the tubers at the time of setting. Now, newly-cut sets are very liable to rot or to be destroyed by insects, to say nothing of the fact that a fresh cut or wound causes bleeding, and renders the exposed surface an easy prey to all kinds of insect pests and fungoid diseases. This risk is reduced, however, if the sets are cut some days before planting, so that the wound may become healed by exposure to the air. A little powdered charcoal, flowers of sulphur, or slaked lime sprinkled over a freshly-cut surface will soon form a new skin.

CUT TUBERS GROW QUICKLY.

We have observed that this cutting of the tubers greatly encourages the quick growth of the plant—a point of great importance. Further, it will be found that half of a large tuber has a hereditary vigour greater than that of a whole small root, and if the number of tubers obtained is no more, their size is greater.

Potatoes which have thrown out long shoots in a cellar should not be used for planting. Our heaviest yields are always obtained from sets which have been sprouted in the open air in a warm but dry spot, until the shoots have reached a length of about 1 inch. These rudimentary shoots grow more quickly, become thicker, give finer leaves and are less likely to be broken. Also the germs are strong enough to stand the risks of planting and other dangers.

Other advantages of forcing vegetation in this manner in the open air are that much time is saved, and, in wet or bad weather or if the ground is not prepared, the yield will be much increased both in number of tubers and gross weight, and the produce will be much richer in starch, and cook better.

SELECT PROFITABLE VARIETIES.

Perhaps the most difficult task a small allotment-holder finds himself up against is that of deciding which crops he shall grow and which he shall leave out. He wants to make his plot produce the greatest possible amount of food, but to do this requires a very careful selection and arrangement of varieties. It is with the idea of making his task an easier one that the following hints are written.

To begin with, he should roughly divide his patch into five parts, four of which this year to be given over to potatoes—i.e., one part each to "earlies" and "seconds," and two parts to "laters." The remaining fifth may be trenched and manured in the usual way, to be cropped

with other vegetables. The other parts should be trenched as opportunity offers.

VEGETABLES FOR SMALL PLOTS.

For crops to follow the potatoes, purchase from a reliable firm packets of Brussels sprouts, savoy cabbages, and curly kale; these are known as "winter greens," and prove very useful vegetables from late autumn to early spring. At the same time order similar packets of such seeds as purple sprouting broccoli, spring and autumn cabbages, cos or cabbage lettuces, and parsley.

Leeks, spring onions, radishes, and parsnips should also find a place, but for these double or treble the quantity of seed will be necessary. One kind of dwarf pea (a pint sows 60 feet) may also be sown in succession.

Beets, carrots, and turnips are hardly profitable enough to grow in a small patch, and are best omitted until the ground is in better "heart"; but a row or two of dwarf French beans should go tried. Broad beans and scarlet runners, on the other hand, demand more room than may be spared, as do ranunculus, celery, and onions to bulb. In any case, the last three vegetables are better bought as plants, when they cost from 6d. to 1s. per hundred.

Shallots are easy to grow, take up little space, and are useful for pickling; fifty small sets (about 1 lb.) should suffice for five or seven ordinary bottles.

WHEN TO PREPARE SEED-BEDS.

Now for the actual work of cropping: On a fine day in March, break down and rake to a fine tilth a small piece of ground for seed-beds, adding some wood ashes and such if handy. Leave this two or three days to settle; then divide it into small plots, say 2 feet square, and on them sow the Brussels sprouts, autumn and winter cabbages, curly greens, purple sprouting broccoli, and leeks. Be sure and mark the exact position of each of these and the date of sowing. Very thin or scattered sowing is essential if good sturdy plants are to be raised.

Should the weather be dry afterwards, give the ground an occasional soaking through a fine rose, and when the seedlings show surround the beds with a good dusting of lime or soot. This will keep slugs in check. If birds are also troublesome, stretch black cotton on short sticks, in and out, above the plants.

HAVE YOU MADE THAT BONFIRE?

Now that potash manures are practically unobtainable, the bonfire is of greater importance than ever, for this is the only means whereby smallholders and allotment-holders can obtain a cheap supply of potash for crops such as potatoes and onions, which cannot do well without it.

Ashes obtained by burning young wood such as hedge trimmings, prunings from fruit trees and bushes, cabbage and similar stalks, and any weeds such as twich, corn-bine, docks, &c., which will not readily decay in the compost heap, usually contain a percentage of potash very nearly equal to that in a good sample of salit. As, however, 50 per cent. of the potash will be lost if the ashes are exposed to one good shower of rain, they should be collected as soon as the fire is out and then stored in a dry place till required, or else distributed immediately over the land intended for potatoes and onions.

DON'T WASTE PLANT FOODS.

Any vegetable refuse which is likely to decay quickly, especially pea and bean straw, which contains another valuable plant food, should not be burnt, as it will be more valuable in the compost heap. Nitrogen is taken from the atmosphere by pea-bearing plants, and it will return to the soil, as so often happens, the bonfire is started with the dry pea and bean straw left over from last year's crop.

Ashes and cinders from coke or coal fires should not be used on the ground except for making paths. This material never decays, and once in the soil it is there till doomsday, causing a loss of fine scabby potatoes, and other troubles.

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R.N. ARCTIC RING.

NEW LABOUR PARTY.



An officer from one of H.M. ships in his winter clothing. Thus equipped he can defy the rigours of the Arctic

Trade Unionists Resent Socialists' Attitude.

MR. JOHN HILL'S VIEWS.

Interviewed by a "Chronicle" representative yesterday regarding the proposal to form a new Trade Union Labour Party, Mr. John Hill, general secretary of the Boilermakers' Society, said that he was aware that Mr. J. B. Williams had been submitting his proposals to Trade Union leaders, but he was not aware of any organisation having given him any support. Mr. Williams was a member of the Parliamentary Committee of the Trade Union Congress which was now working in the closest co-operation and harmony with the Labour Party, and he regarded what he termed the secret action of Mr. Williams as a most unfair attack on his colleagues. Mr. Williams had had every opportunity of openly advocating his proposal, but had not done so on any occasion, and in his (Mr. Hill's) opinion he had been working secretly against their efforts in which they were led to understand they had his co-operation.

The Question of Support.

The Labour Party, Mr. Hill pointed out, was originally a political committee, and the Trade Union Congress found it necessary about 17 years ago to set up such a committee when a considerable percentage of the affiliated societies had no power to support Congress in political activity. To-day the need for that division of their activities had disappeared, and the Trade Union Congress and the Labour Party acted in absolute unity and harmony in regard to all important public activities.

Mr. Williams, he proceeded, had accepted a very lucrative position under the Government, and directed his activities against their Macdonalds, who had refused positions under the present Government owing to their difference with the Government on war policy.

Asked if he considered that the new movement would receive any appreciable support, Mr. Hill replied that the scheme was not likely to be supported either nationally or locally.

Why the New Party has been Formed.

The movement is the tangible expression of the resentment of a body of Trade Unionists to what is described as "the domineering and overbearing attitude of the extreme Socialist wing of the Labour Party." The promoters of the new Trade Union Labour Party intend the movement to be on the same basis as the Trades Union Congress, under whose auspices it would work. Membership would be restricted to Trade Unionists and Trade Union officials. Many Trade Unionists, it is said, consider it was a mistake on the part of the Congress to have handed over their political interests to a separate organisation, and that these interests could better be advanced by an ad hoc party to carry out its well-defined functions, viz.:-

1. To watch all legislation affecting Labour.
2. To initiate such legislation as Congress may direct.

The promoters of the movement, says the

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AQUA.

Water.

History.—From the almost universal solvent powers of water, it is the most extensive pharmaceutical agent that we possess, beside being, when properly employed, a most valuable remedy for a large number of diseases. The purest water that can be obtained is *distilled water*, which when properly prepared in clean, glass vessels, is colorless, transparent, tasteless and inodorous, with the assumed specific gravity of unity, and with which as a standard, the specific gravities of all solids and liquids are compared. It is the only admissible water for pharmaceutic and chemical tests, as the presence of organic or saline substances in it, may decompose the articles to be dissolved, or impair its solvent power. At a temperature of 32° or lower it becomes ice; at 212° or above, it forms steam, in which its bulk is augmented to nearly 1700 fold, and its specific gravity reduced to about half that of atmospheric air; it is likewise compressible to a certain extent. It is capable of absorbing or dissolving to a greater or less amount, all of the gases; and even in the driest weather, it constantly exists in the atmosphere, in the form of invisible vapor. Pure water consists of one equivalent of hydrogen, 1, and one of oxygen, 8—9=HO. It is perfectly neutral, exhibiting neither acid nor basic properties, though capable of combining with each, and increasing their activity. It should always be kept in glass vessels. The solvent power of water is increased by heat.

Water is known as *Soft-Water*, *Hard-Water*, and *Mineral-Water*; the *soft* are always preferred to *hard-waters* in pharmaceutical preparations, and may be known by their forming a lather with soap, notwithstanding they may contain considerable impurities. Hard-water, contains one or several salts of lime, with other impurities, curdles soap, and is unfit for internal use, or domestic purposes. An excellent test for determining the quality of water is the tincture of soap; in distilled water it produces no effect; in soft water, only a slight opalescence; and in hard water, a milky appearance. We have several varieties of water, as rain, snow, spring, river, well, lake, and marsh water; the first two are the purest, the following three come next in order, and the last is unwholesome, and ought never to be employed for domestic or medicinal purposes. Good water is limpid, without smell, and does not curdle soap; and its transparency is but little affected by nitrate of baryta, nitrate of silver, or oxalate of ammonia.

Rain and *snow-waters*, are distinguished from distilled water, chiefly by their holding in solution an unusual amount of atmospheric gases. To obtain either of them pure, they must be collected in large clean vessels as the rain or snow falls toward the earth; and this should be done at some distance from houses, commencing some time after they

have fallen, in order to avoid the contamination of dust and other impurities in the atmosphere, which is usually present with the first fall of the rain or snow.

Rain-water, (aqua pluvia) may by proper precautions be obtained tolerably pure from the roofs of houses on which it falls, by allowing the impurities to be washed away in the commencement of a heavy rain. In large cities the rain-water contains nitrogenized organic matter. Both rain and snow-waters may be applied to every domestic purpose, as well as to most chemical and pharmaceutical operations. But no water should ever be used which comes in contact with lead—for the lead becomes oxydized by the oxygen of the water, which oxide is reduced to a carbonate by the action of the carbonic acid derived from the air, and the water thus containing lead may produce the poisonous effects of that metal upon the system. The more soft and pure the water, the greater the risk.

Spring-water, (aqua fontana,) is that which springs from the earth, free from large amounts of carbonic acid, or salts, and not possessing elevated temperatures; it is the general beverage of mankind, and is applicable to all domestic purposes. Its quality depends entirely on the strata through which it flows; those springs arising from traprocks, sandstones, transition rocks, and primitive rocks are the purest; those from alluvial strata, limestone, and coal formations are the least pure. All however contain variable traces of the salts of lime, soda, or magnesia, which vary according to the locality of the spring.

River-water, (aqua fluvialis) especially when passing through alluvial countries and near great cities, contains suspended in it more or less earthy, and vegeto-animal impurities, which impair its transparency, but which in a short time will purify itself during its downward course. In countries where the rivers pass chiefly over primitive rocks, the waters are found to be almost perfectly pure. When moderately pure it is fit for all ordinary purposes, though if it contain much vegeto-animal matter, it is apt to occasion dysentery, and other affections of the bowels, and then becomes inadmissible in pharmacy. The Croton water of New York, the Schuylkill water of Philadelphia, and the Ohio river water, are, when filtered, sufficiently pure for all the purposes of pharmacy, where distilled water is not expressly required. *Lake-water*, in the United States, is generally a pure and wholesome water; in other instances it is similar to the river-water.

Well-water, very much resembles spring-water in its qualities, its purity being proportioned to its depth and amount of use. In large cities well-water always contains nitrates, owing to the rapid oxidation of nitrogenized organic matter, which filters through the soil. These nitrates prevent the formation of any vegetable matter in water, even when long kept. A very pure water is usually obtained from the Artesian or overflowing wells.

Marsh-water being commonly stagnant, and containing vegetable matters in the process of decomposition, is unwholesome, and should never be employed for domestic or medicinal purposes.

The *Journal of Pharmacy* of March, 1848, gives the following process of Dupasquier to ascertain whether there is an amount of organic matter held in solution in water, above the minute quantity usually present in good water: Place into a small flask one or two fluidounces of the water to be tested, and to it add a few drops of solution of chloride of gold, free from excess of muriatic acid, enough to give the water a slight yellow tint; then boil it. If the yellow tint remains unchanged, the ordinary proportion of organic matter is present; but if the liquor becomes at first brownish and afterward violet or bluish, in consequence of the reduction of the gold, the water holds a greater amount of organic matter than usual. This organic matter is of the nature of *ulmin* or *gein*.

Prof. Faraday states, that "one grain of water will require for decomposition an electric current equal to a very powerful flash of lightning." The chemical action of a grain of water upon four grains of zinc, can evolve electricity equal in quantity to that of a powerful thunderstorm; and he states, that from his experiments it would appear, that 800,000 such charges of the Leyden battery would be necessary to supply electricity sufficient to decompose a single grain of water. The Leyden battery of which he speaks, consists of fifteen jars, containing 3510 square inches, or about twenty-four and a half square feet of coated glass, charged by thirty turns of a plate electrical machine, the plate being fifty inches in diameter, and of immense power, giving ten or twelve sparks an inch long for each revolution. In relation to this an author in the *Philosophical Magazine* remarks, that "the estimate that 800,000 discharges of the battery of fifteen jars, equal to a powerful flash of lightning, would be necessary to resolve a single grain of water into its elements, is certainly astounding, when it is recollected that, according to Prof. Faraday, the quantity of electricity that decomposes a body, is the equivalent quantity of electricity that had previously held the elements of that body in combination; for he, with Davy and others, conceives that electricity and chemical affinity are identical powers. Hence, in one grain, that is, one drop of water, there must be naturally existing, and constituting the affinity between its oxygen and hydrogen, no less a quantity of electricity, than 800,000 charges of a battery, containing 3510 square inches of coated glass, or the equivalent of a very powerful flash of lightning. If this quantity of electricity were converted into one spark, it would be 4166 miles in length, taking Prof. Faraday's mean estimate of one charge of his battery as the basis of calculation."

Mineral waters, are those which present a large proportion of carbonic acid, with or without saline, alkaline, metallic, earthy and other foreign

substances, and which exert an appreciable therapeutical influence on the animal economy. For all practical purposes, they may be conveniently arranged into *carbonated*, *sulphureted*, *chalybeate*, and *saline mineral* waters, for an account and list of each of which, see *Appendix*. When the water is elevated in temperature they are called *Hot* or *Thermal* springs; when of ordinary temperature or lower, they are called *Cold Mineral Springs*.

Properties and Uses.—As a remedial agent, apart from its natural necessitous use, water internally is a tonic, diuretic, or sudorific, according to its mode of administration. Small quantities, taken cold, between 45° and 60°, and occasionally repeated, act as a tonic; in larger doses it produces diuresis, and diaphoresis, the latter effect more especially, if the patient be kept warmly covered, and it is extensively used for this purpose in many acute diseases. Warm water, between 60° and 100°, relaxes the fibers of the stomach, and, particularly if given in large quantities, is apt to provoke nausea and vomiting. In fevers, water is a grateful drink, allaying thirst, moderating the fever, often producing sleep and relief from restlessness; and is sufficient, unaided by other means, to effect a rapid solution of the disease, in many instances. It should never be withheld from patients laboring under febrile or inflammatory complaints, who crave it. During the operation of a vegetable emetic, cool water at 60°, is more agreeable, and fully as beneficial in assisting the emesis, as warm.

Externally, water is frequently applied as a sedative in local inflammations, as quinsies, sore-throats, ophthalmia, sprains and contusions, and as a means of restraining hemorrhage. Cloths wet with cold water and applied to the abdomen, have relieved severe pain in the bowels, retention of urine, etc. The cold dash or douche, has been successfully employed in delirium tremens, apoplexy, tetanus, hysteria, convulsions, obstinate constipation, congestive, bilious and typhoid fevers. The wet sheet is much used to allay febrile and inflammatory conditions, and to promote diaphoresis. As an injection it has been efficient in habitual constipation, and excessive tympanitic distension, as well as dysentery. Applied warm it is an excellent application to erysipelatous inflammations. Ice and iced water, as a local application, are said to be very useful in burns and scalds, also in many cerebral affections.

As a bath, water is also an important remedy. The *vapor-bath* accelerates the circulation, produces profuse sweating, and softens and relaxes the skin, and may be employed in a variety of cases. The *hot bath* has a similar effect, but is apt to be dangerous in some constitutions. The *warm bath* diminishes the frequency of the pulse, lessens the frequency of respiration and the heat of the body, and relaxes the skin. It acts as a soothing remedy, producing a disposition to sleep. It is useful in febrile and inflammatory diseases, characterized by frequent

pulse, preternaturally hot and dry skin, and much restlessness; also in spasms and convulsions of children, retention of urine, nephritic pains, and the like. It is contra-indicated in diseases of the head and chest. The *cold bath* acts according to its temperature and mode of application, as a stimulant, tonic, and sedative.

The following are the temperatures at which baths are usually applied:—

Water, cold,.....	50° to 75° F.
do temperate,.....	75 to 85 “
do tepid,.....	85 to 92 “
do warm,.....	92 to 98 “
do hot,.....	98 to 112 “
Vapor, if breathed, tepid,.....	90 to 100 “
do do warm,.....	100 to 110 “
do do hot,.....	110 to 130 “
do if not breathed, tepid,.....	96 to 106 “
do do warm,.....	106 to 120 “
do do hot,.....	120 to 160 “
Hot air, as a sudorific,.....	85 to 100 “
do as a stimulant,.....	100 to 130 “

In addition to the above uses of water, it has likewise other employments, as follows:—

The *WET SHEET PACKING*, or *Lien Tuch* of the Germans. A mattress of cotton, hair, or straw, has spread over it three or four large, thick comfortables, and over these one or two soft flannels. A linen sheet having been previously dipped in cold water, or for very delicate persons in tepid or even warm water, is lightly wrung out, so as not to drip, and spread over the whole, having under it one or two pillows for the head. The patient is made to lie upon these on his back, and is quickly and snugly enveloped in the wet sheet, over which is placed the flannels and blankets, or a light feather-bed may be thrown over the top, in case comfortables are not plenty. Care should always be taken to turn the clothing snugly and smoothly around the feet and neck; and if the feet remain cold, bottles of cold water should be placed to them. Headache is prevented or removed by the application of cold wet cloths applied to the head.

The time for remaining thus “packed,” varies in different cases, averaging from half an hour to an hour, depending on the effect; the body should become comfortably warm before being removed. A disagreeable sensation of cold is first experienced, which is soon followed by a pleasurable warmth over the whole surface, and sometimes copious perspiration, though this last is not always indicated. On coming out of the “pack,” the plunge, the douche, rubbing wet sheet, or towel-washing are to be employed as the case may require. If the patient experiences a chill after coming out, a thorough rubbing, followed by fifteen or twenty minutes’ dry packing, will usually obviate all injurious

consequences. The process of packing should never be continued so long as to cause headache, languor, muscular debility or giddiness.

This is said to act as a sedative, reducing the heat of the body, and excessive arterial action, and as an alterative, correcting morbid secretions and restoring healthy ones. In fevers, and all acute inflammatory disorders, it may be frequently renewed according to the degree of fever or inflammation, until the temperature and circulation are reduced to the natural standard, and the skin becomes soft and perspirable. Much sweating is not usually to be desired. In chronic diseases, it removes internal congestions, develops external circulation, produces a healthy condition of the skin, and may be used in many forms of this class of maladies. If carelessly attended to, the wet sheet may give rise to serious difficulties.

When the wet sheet is applied to the trunk of the body only, as in cases of feeble persons, where there is not sufficient vitality for the whole sheet, or for other purposes, it is termed the "HALF PACK SHEET."

The DOUCHE (*doosh*) is the application of a stream of cold, tepid or warm water, from a greater or lesser height, and continued for a time indicated by its effects. The force of the stream, and time of application should be carefully adapted to the strength of the patient. Very nervous persons, and those subject to determinations to the brain, should resort to it with extreme caution. A strong douche should never be applied to the head, nor should it be long continued on any one spot along the vertebral column. A douche may be vertical, oblique, horizontal, or ascending. The most common are in perpendicular streams one or two inches in diameter. Its effect is to arouse the activity of the absorbent system, and is hence very useful in gout, rheumatism, paralysis, chronic enlargements of the viscera, tumors, etc.

The ascending douche will be found beneficial in piles, uterine displacements, prolapsus ani, constipation from debility, chronic enlargement of the prostate gland, impotency, etc. The stream may be half an inch to an inch, and should not be forcible enough to cause absolute pain nor serious inconvenience. Warm water douches are for the purpose of producing relaxation of the muscles of the part acted upon, and are hence useful in rigidity of the muscles, painful swellings, chronic inflammation of the joints, neuralgia, spasmodic and bilious colic, retention of urine, amenorrhœa, uterine rigidity, etc. In some cases it should be followed by a momentary cold dash.

The RUBBING WET SHEET is a large sheet dipped in water, and wrung out so as not to drip. It is then suddenly thrown around the patient's body, enveloping him closely from the neck to the feet, and the body is then rubbed for about five minutes by the hands of the attendant on the outside of the sheet. It is to be followed by rubbing with dry towels. This produces a strong and general determination to the whole surface,

and is applicable in all cases where a strong determination is desired from internal organs or surfaces to the skin. It will be found valuable in the early stages of bowel complaints, diarrhea, dysentery, colic, fevers, etc.; it is likewise useful for exhaustion following mental exertion, many forms of insanity, delirium tremens, nightsweats, wakefulness, nightmare, etc. When the sheet is employed drippingly wet, (*the dripping sheet*) a large tub or pan is necessary for the patient to stand in, to avoid wetting the floor.

The HIP or SITZ BATH is a common tub, in which the patient sits so as to have the water cover the hips and lower part of the abdomen. A vessel made for the purpose, with a back to rest against is more convenient. The water may be of any temperature, and the time of application varies from five to thirty minutes. According to its application it is tonic, derivative, or sedative. Tonic when applied from five to fifteen minutes; derivative when extended from fifteen to thirty minutes; and sedative according to its effects. Derivative hip baths should not be carried to the point of producing paleness or lividity of the lips, shiverings, nausea, faintness, or headache, and according to the effect desired, and the coldness, torpor, and debility of the patient, indicate that the quantity of water should be lessened, or its temperature elevated. It is useful in debility, irregularity, obstruction, and torpor of the organs of the pelvis and lower part of the abdomen. A blanket is generally thrown around the patient during this bath.

The SHALLOW BATH is a circular, or oval tub, raised about twelve inches from the floor, and with water in it from four to six inches deep. The patient sits in this, while the attendant sprinkles his head, and rubs his chest, abdomen, and back. It may be employed from one to thirty minutes, and should be followed by a good dry rubbing. It is used at a temperature from 60° to 75°, and is excellent in cutaneous affections, and other cases where a mild derivative, or moderately-sedative influence is desired.

The PLUNGE BATH may be any vessel or place, the water being from 55° to 65°, which will allow the patient to plunge into it, head, or feet foremost as he fancies, or to quickly immerse the whole body up to the neck. The time for remaining in it, varies from a few seconds to two or three minutes, or in high fever, to ten or fifteen minutes. It is generally taken after the sweating process, and after the wet sheet, when the patient can bear the exertion; in these cases the sheet is not to be removed until at the plunge. It is very useful in all febrile and chronic affections, but should be employed with care, or avoided altogether in consumptive, and dropsical patients, and those laboring under organic diseases of the heart.

These are the principal applications of water in Hydropathic practice; yet there are several others of a useful character, as the *Foot Bath*,

the *Head Bath*, the *Shower Bath*, the *Vapor Bath*, etc., the mode of application of which are generally well understood, as well as their effects. Cold water may likewise be used in form of a *bandage* or *girdle*, by applying one or more folds of linen wet in cold water, to the part affected, or around the abdomen, and covering it with a dry cloth or other material to retain the heat. The *wet girdle* or *abdominal wrapper* or *compress*, is applied around the abdomen in all acute diseases of the abdominal viscera. The *bandages* are applied warm or cold, according to the indications they are intended to fulfill.

Mineral waters vary in their effects upon the system, according to their constituent combination. The *acidulous* waters are powerful and diffusive stimulants of the nervous and circulatory systems, likewise diuretic. Generally useful in dyspepsia, passive dropsy, chronic diseases, chlorosis, and phosphatic gravel; contra-indicated in recent palsy, apoplexy and active hemorrhages and inflammations.

Alkaline waters are antacid, antilithic, and diuretic. Useful in gout, gravel and stone. *Purgative* waters also possess diuretic properties, and are useful in all cases where laxatives are required. *Chalybeate* waters are tonic, and used in dyspepsia, all kinds of chronic cachexies, gout, and chronic diseases generally. *Sulphurous* waters are stimulant, diaphoretic, diuretic and emmenagogue, and are found beneficial in chlorosis, rheumatism, dysmenorrhea, secondary syphilis, chronic cutaneous diseases, and deranged conditions of the stomach and liver. They are contra-indicated in plethora, determination to the head, and active hemorrhages and inflammations. Waters which contain iodine or bromine, have been found of some use in goitre and scrofula. *Sea-water* internally is an emetic and purgative; as a bath it has all the effects of an ordinary cold bath, with the addition of exerting a more stimulant action on the skin than fresh water, owing to its saline contents. It has been found serviceable in rickets, enlargement of glands, or joints, some chronic cutaneous eruptions, scrofula, and many chronic diseases.

ARALIA HISPIDA.

Dwarf Elder.

Nat. Ord.—Araliaceæ. *Ser. Syst.*—Pentandria Pentagynia.

BARK OF THE ROOT.

Description.—*Aralia Hispida* is a perennial plant, with a low stem, from one to two feet high, the lower part woody and shrubby, and thickly beset with sharp, stiff bristles, the upper part herbaceous and branching. The *leaves* are bipinnate; the leaflets oblong-ovate, acute, cut-serrate; *umbels* many, simple, globose, axillary and terminal, on long

peduncles, followed by bunches of dark-colored, nauseous berries. It flowers from June to September. The whole plant exhales an unpleasant odor.

History.—This is a low undershrub, growing from New England to Virginia, in fields, hedges, rocky places, and along the roadsides. The fruit is round, black, and one-celled, containing three irregular-shaped seeds. The bark of the plant is employed in medicine, but that of the root is the most active. It yields its virtues to water. It is known in various sections of the country by the names of *Wild Elder*, *Bristlestem-Sarsaparilla*, etc.

Properties and Uses.—The leaves in warm infusion are sudorific. The bark is diuretic and alterative. Very valuable in dropsy, gravel, suppression of urine, and other urinary disorders. The juice and decoction of the fresh roots are said to be emetic and hydragogue, and have been found efficacious in dropsy. Dose of decoction, two to four ounces, three times a day.

Off. Prep.—Decoctum Araliæ.

ARALIA NUDICAULIS.

Small Spikenard.

Nat. Ord.—Araliaceæ. *Sex. Syst.*—Pentandria Pentagynia.

THE ROOT.

Description.—*Aralia Nudicaulis* is an indigenous perennial plant, with one leaf and one flower-stem, springing together from the root, or from a very short stalk, and seldom rising two feet in height. The root is large and fleshy. The leaf, which stands upon a long foot-stalk, is either tri-ternate, or tri-quinate, with oblong-oval, acuminate leaflets, rounded at the base, serrate on the margin, and smooth on both surfaces. The flower-stem or scape is naked, shorter than the leaf, and terminating by three small umbels, each consisting of from twelve to thirty yellowish or greenish flowers. The fruit consists of small round berries, about the size of the common elder. The root is horizontal, creeping, several feet in length, more or less twisted, as thick as the little finger, and of a yellowish-brown color externally.

History.—This plant, sometimes known as *American*, *Wild*, or *False Sarsaparilla*, is indigenous, growing in rocky woods and rich soils in the northern and middle States. The root, which is the officinal part, possesses a fragrant balsamic odor, and a warm, aromatic, sweetish taste. It yields its virtues to water or alcohol.

Properties and Uses.—Alterative, and gently stimulant. Used in decoction or syrup as a substitute for *Smilax Sarsaparilla*, in cutaneous,

rheumatic and syphilitic affections; also in pulmonary diseases. Externally, a strong decoction of it is useful as an application to zona (shingles) and as a stimulant wash to old ulcers.

The *Aralia Racemosa*, *Pettymorrel*, or *Spikenard*, has a herbaceous, widely-branched, smooth stem, three or four feet in height, dark-green, or reddish, and arising from a thick aromatic root; the leaves are compound; the leaf-stalks divide into three partitions, each of which bears three or five large, ovate, pointed, serrate, slightly downy leaflets. Umbels numerous, small, arranged in branching racemes from the axils of the leaves or branches. It flowers in July, and grows in rich woodlands. The root is large, spicy, and aromatic, and possesses properties similar to that of the *A. Nudicaulis*; it is much used in pulmonary affections, and enters into the compound syrup of spikenard.

Off. Prep.—Syrupus *Araliæ Compositus*.

ARALIA SPINOSA.

Prickly Elder.

Nat. Ord.—Araliaceæ. *Sex. Syst.*—Pentandria Pentagynia.

BARK.

Description.—The *Aralia Spinosa*, sometimes called *Toothache Tree*, *Southern Prickly Ash*, and *Angelica Tree*, is an indigenous arborescent shrub, with a crooked, shrubby, unbranched stem, which is naked and prickly below, with the leaves crowded at the summit of the stems, somewhat like the palms; it is generally not more than ten to twenty feet high, but in the south it sometimes attains to even sixty feet. The petioles are very long and prickly; the leaves are bipinnately compound, composed of ovate-acuminate, serrate, mostly glabrous leaflets, which are somewhat glaucous beneath. The umbels are in large, much branched panicles, with small, few-leaved involucre. The flowers are small, white, with connivent styles, and appear in August and September; sometimes they are polygamous, as the number of berries bears no proportion to the flowers. The fruit is a blackish, juicy berry.

History.—The Prickly Elder is found chiefly in the southern and western States, and is much cultivated in gardens as an ornamental plant: It grows in low, damp, fertile woods. The bark, root, and berries are medicinal, but the first is principally employed; it yields its properties to alcohol or water. It is thin, of a grayish color externally, and a yellowish white within, with a peculiar but aromatic odor, and a bitterish, pungent, acrid taste.

Properties and Uses.—Aromatic, stimulant, diaphoretic and alterative; the fresh bark is emetic and cathartic. The tincture has been used in

chronic rheumatism, syphilis, and in some cutaneous diseases. The warm infusion will vomit, unless made very weak. The tincture of the berries has been found advantageous in violent colic, and rheumatism, and from their pungency, have been found beneficial in relieving tooth-ache. Much use was made of this bark by the Eclectics in Cincinnati, during the cholera of 1849-50, in cases where cathartics were required, but where the action of every purgative was very difficult to control; the preparation was composed of one drachm compound powder of Jalap, one drachm *Aralia Spinosa*, and two drachms compound powder of Rhubarb. Given in powder, in half teaspoonful doses; or the powder was infused in half a pint of boiling water, of which infusion, when cold, a tablespoonful was given every half hour. In no case in which it was given, did it produce a tendency to looseness or choleraic discharges.

It is a powerful sialagogue, and is valuable in diseases where the mouth and throat are dry and parched, as a very small portion of the powder will produce a moisture and relieve difficult breathing; also useful in sore-throat.

Off. Prep.—Decoctum *Araliæ Spinosa*; Tinctura *Araliæ Spinosa*.

ARCTIUM LAPPA.

Burdock.

Nat. Ord.—Asteraceæ; Cynaraceæ, (*Lindley*). *Sex. Syst.*—Syngenesia *Æqualis*.

ROOT AND SEEDS.

Description.—By De Candolle this plant is named *Lappa Minor*, and by Gærtner, *Lappa Major*. It is a biennial plant, with a fleshy, tapering root, a foot or more in length, of a brown color externally, white internally, furnished with thread-like fibers, and having withered scales near the summit. The *stem* is erect, three or four feet high, succulent, pubescent, branching, bearing very large, cordate, denticulate *leaves*, of a dark-green color above, whitish and tomentose beneath, and standing on long footstalks. The *flowers* are purple, globose, in paniced heads. The *involucre* consists of imbricated scales, with a horny, hooked extremity, by which they can attach themselves to clothes, and the hair or wool of animals. The *florets* are all perfect, five-cleft, with a ten-nerved tube. The *stamens* have papillose filaments, and their *anthers* are terminated by filiform appendages, and have subulate tails at the base. The *stigmas* are free at the apex, diverging and curved outward. The *receptacle* is somewhat fleshy, flat, and furnished with stiff subulate fringes. The *achenia* are oblong, smooth, with a rough, prickly pappus. The *seeds* are quadrangular.

History.—Burdock is a native of Europe, and grows abundantly in this country, among rubbish, on road-sides, and cultivated grounds. The root and seeds are the officinal parts; the first loses about four-fifths of its weight by desiccation; it should be collected in the spring. The odor of the root is weak and unpleasant, the taste sweetish, mucilaginous, slightly bitter and astringent. It contains sugar, gummy extractive, a large quantity of inulin, some salts, etc. Water or diluted alcohol extracts its properties. The seeds are aromatic, bitterish, and somewhat acrid.

Properties and Uses.—Alterative, diaphoretic, diuretic, and aperient. Useful in scorbutic, syphilitic, scrofulous, gouty, leprous, and nephritic diseases. To prove effectual its use must be persevered in for a long time. The seeds are more diuretic than the root, and are said to be likewise a more useful alterative; they are principally used in nephritic complaints. Externally the leaves or their juice in the form of an ointment, have been employed with advantage in cutaneous diseases, and obstinate ulcers. Dose, of a decoction or syrup, half a pint three times a day.

Off. Prep.—Infusum Arctii; Extractum Arctii; Syrupus Sarsaparillæ Compositus.

ARCTOSTAPHYLOS UVA URSI.

Uva Ursi.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

LEAVES.

Description.—This plant, known also as *Bearberry*, *Upland Cranberry*, etc., is a low, evergreen shrub, with a perennial, long, fibrous root; the stems are procumbent, round, woody, and branched, covered with a smooth, deciduous bark. The leaves are numerous, alternate, evergreen, obtuse, obovate, entire, coriaceous, smooth, dark-green and wrinkled above, reticulated and paler beneath, acute at base, and supported on short petioles. The flowers grow in small clusters at the extremities of the branches, each on a short, red, reflexed peduncle, furnished with several minute bracts; they are usually six to twelve on each branch, drooping, and of a pale rose color. The calyx is small, obtusely five-toothed, persistent, and of a reddish color. The corolla is ovate or urceolate, smooth, white with a reddish tinge, transparent at the base, contracted at the mouth, hairy inside, with five short, reflexed segments. The stamens are ten, with subulate downy filaments inserted at the base of the corolla, and reddish incumbent anthers, of two oval cells, opening by two terminal pores, and furnished with a pair of short horns or spurs.

The *ovary* is roundish, bearing a cylindrical erect style, with a simple stigma. *Disk* a black indented ring. *Fruit* small, globose, smooth, depressed, scarlet, containing a mealy pulp of an austere or insipid taste, and five almost united angular seeds. This plant is the *Arbutus Uva Ursi* of Linnæus, and Willdenow, from which it was separated by Sprengel, principally on account of the difference of its berry.

History.—The *Uva Ursi* is a perennial evergreen, common in the northern part of Europe, Asia, and America, growing on barren, gravelly hills, and elevated sandy plains. It flowers from June to September, and ripens its berries during the winter. The leaves are the only part used in medicine, they should be collected in autumn, and the green leaves only selected. They are about an inch long, and two to three lines wide, often spatulate in form. They are sometimes adulterated with the leaves of the whortleberry or cowberry, *Vaccinium Vitis Idæa*, from which they may be detected, by the rounder shape, and the revolute edges of the *Vaccinium*, and by their being dotted beneath instead of reticulated as in the genuine leaves. Leaves of the *Chimaphila Umbellata* may be determined by their greater length, their cuneiform lanceolate shape, and their serrate edges.

The leaves of *Uva Ursi* when dried have a faint odor like hay, and a bitterish, strongly astringent taste, which becomes finally sweetish. Their powder is of a yellowish-brown color. Analysis has discovered in them gallic and tannic acids, resin, gum, bitter extractive, some salts, volatile and fixed oils, lignin, and a peculiar principle, called *ursin*, which contains its diuretic power. The leaves yield their properties to water or alcohol.

Ursin, is said by J. C. C. Hughes, to be prepared as follows; macerate one pound of the leaves of *Uva Ursi* in water for twelve hours, and displace until two quarts of liquor are obtained. Then precipitate the tannin with a solution of gelatin, and filter. Evaporate the filtered liquor to dryness, and dissolve the remaining extract in strong alcohol, and treat it with purified animal charcoal for twenty-four hours. Again filter, evaporate, and redissolve in absolute alcohol, and treat again with purified animal charcoal for twenty-four hours; filter and crystallize by spontaneous evaporation. Press the crystals, redissolve in absolute alcohol, treat with animal charcoal, filter, and again crystallize by spontaneous evaporation. The crystals are colorless, transparent, needle-shaped prisms, soluble in alcohol, ether, and dilute acid, but insoluble in fixed and essential oils. Subacetate of lead and carbonate of potassa precipitate its aqueous solution; lime-water, and tincture of chloride of iron do not affect it. It is neutral to test-paper, and combustible. One grain acted as a powerful diuretic. *Arbutin* and *Arctuin* have also been obtained from the leaves by Kavalier, but their therapeutical influences are not positively known.

Properties and Uses.—Uva Ursi is an astringent, tonic, and diuretic. As an astringent it is applicable to all the purposes for which astringents are used, as in chronic diarrhea and dysentery, diabetes, and menorrhagia. Its principal use however is in chronic affections of the kidneys and urinary passages, in vesical catarrh, chronic gonorrhea, gleet, leucorrhea, incontinence of urine, strangury, and in excessive mucous discharges. It changes the color of the urine, and its astringent principle has been detected in that secretion, also reputed efficacious as an antilithic in calculous affections. In gonorrhea, with bloody and mucous discharges, and pain in the vesical region, it speedily allays all these unpleasant symptoms. Dose of the powder ten to sixty grains; of the decoction, one to three fluidounces, made by boiling one ounce of Uva Ursi with a pint and a half of distilled water to a pint; of the extract five to fifteen grains.

Off. Prep.—Decoctum Uvæ Ursi.

ARGENTI NITRAS.

Nitrate of Silver. Lunar Caustic.

Preparation.—Mix Nitric Acid, *five fluidrachms* with distilled water *two fluidounces*, and dissolve silver, in small pieces, *one ounce*, in the mixture on a sand-bath; then gradually increase the heat, so that the resulting salt may be dried. Melt this in a crucible over a gentle fire, and continue the heat until ebullition ceases; then immediately pour it into suitable molds. It should be kept in bottles with glass stoppers, as corks quickly decompose it—especially its solution. If the heat be raised to too high a temperature, the salt decomposes and turns black.

Chemical Properties.—If the solution be allowed to crystallize by evaporation and cooling, it assumes various forms, as hexangular or rhombic tables, or right rhombic prisms, of a transparent or colorless appearance, which turn black when exposed to the light, or to the direct rays of the sun. The stick or rods of the salt, are at first white, but from the action of light, become grayish, and when broken they present a crystalline texture with a radiated surface. They differ from the crystallized nitrate only in form and color, and do not contain any water of crystallization, as has been supposed.

Nitrate of silver is a very heavy salt, having an intense, persistent, and bitter metallic taste; it fuses at 426° , and undergoes decomposition at about 600° , parting with its oxygen and nitrous acid, and leaving the metal in a state of purity. It is soluble in its own weight of cold-water, and in four parts of alcohol. It stains the skin, and almost all organic substances of a dark or black color, and corrodes the soft tissues. These spots may be removed by placing on them a few drops of tincture of

iodine, which converts the salt into an iodide of silver; this is to be dissolved by a solution of hyposulphite of soda, made of the strength of half a drachm to a fluidounce of water, after which the spots may be washed out with warm water.

Indelible ink for marking linen, etc., owes its character to this salt; the common formula for this preparation is as follows: take of nitrate of silver five scruples, gum arabic two scruples, sap-green one scruple, distilled water one fluidounce; mix together; with this the linen is to be marked, having had the following preparation or mordant previously applied; take of carbonate of soda half an ounce, distilled water four ounces.

An ink has, however, been recently used, which does not require a mordant, flows freely from the pen, does not require a strong or long continued heat to develop the black mark, and which will not destroy the texture of the finest cambric. It is prepared thus; dissolve nitrate of silver one ounce, in a sufficient quantity of distilled water; also dissolve crystallized carbonate of soda one ounce and a half, in sufficient distilled water. Mix the two solutions; a precipitate ensues which must be collected and washed on a filter. Introduce the washed precipitate, still moist, into a Wedgewood's-ware mortar, and add to it tartaric acid eight scruples, rubbing them together until effervescence has ceased; add strong liquor ammonia in sufficient quantity to dissolve the tartrate of silver (about two ounces); then mix in archil, half a fluidounce, white sugar four drachms, powdered gum arabic twelve drachms, and add distilled water sufficient, if required, to make six fluidounces of the whole mixture.

Nitrate of silver, especially in solution, should always be kept in bottles with glass stoppers, as cork quickly decomposes it. It is an anhydrous salt, and is composed of 116 parts or one equivalent of protoxide of silver, and 54.15 parts, or one equivalent of nitric acid, ($\text{AgO} + \text{NO}^5$), and is *incompatible* with almost all spring and river-water, on account of the common salt usually contained in them, with soluble chlorides, sulphuric, hydro-sulphuric, muriatic, and tartaric acids, and their salts, with the alkalies and their carbonates, lime-water, and astringent vegetable infusions.

This salt is liable to adulterations, among the principal of which are the nitrates of lead, copper, zinc, and potassa; or it may contain free silver, by having been exposed to too high a heat during fusion. It almost always contains a small proportion of free silver when in sticks, which may be known by the undissolved black powder present in its solution in distilled water. Precipitate a solution of nitrate of silver by an excess of chloride of sodium; if this precipitate is entirely soluble in ammonia the salt is pure; if not, lead is present. Sulphureted hydrogen passed through the liquid, after having removed the above precipitate, gives a white precipitate if zinc be present, and black if there be any copper. Nitrate of potassa may be suspected when a colorless fracture

is presented upon breaking the sticks, and when the salt is entirely soluble, without the black powder sediment. It may be detected by precipitating a solution of the suspected salt with an excess of muriatic acid; pass sulphureted hydrogen to remove any metals present, filter the solution, and evaporate,—if pure it will all evaporate—if nitre be present, it will be left, and easily recognized by its properties. Impurities, without regard to their character, may be ascertained by dissolving 29 grains of the salt in a fluidounce of distilled water, to which 9.12 grains of muriate of ammonia are to be added; briskly agitate the mixture for a few seconds, and then allow it to rest, until precipitation has ceased; then if, on the addition of more muriate of ammonia, no farther precipitation ensues, the salt is impure.

Properties and Uses.—A certain class of practitioners, consider this salt as a tonic and antispasmodic, and employ it to fulfill these indications, in epilepsy, chorea, angina pectoris, etc., as well as administering it in intestinal ulceration during typhoid fever, diarrhea, etc. However, it is never used as an internal agent by Eclectics, but as an escharotic, either dissolved in distilled water, or in the solid form. When employed in solution, its strength is varied, according to the condition of the parts to be acted upon, and the character of the affection—from five grains to eighty to the fluidounce of water. It has been beneficially applied to ulcers, warts and other excrescences, fungous flesh, chancres, and in ulcers of the cornea, some forms of ophthalmia, fetid discharges from the ear, aphthous affections of the mouth, and spongy gums. It has likewise been recommended as a topical remedy in erysipelas and various other external inflammations, leucorrhea, gonorrhoea, uterine ulcerations, granulations, and excoriations, and stricture of the urethra; also in ringworm, and some other forms of chronic cutaneous diseases. A solution of it is highly recommended in chronic laryngitis, pharyngitis, pertussis, asthma, and venereal ulceration of the throat, applied by means of a sponge fastened to one end of a piece of whalebone. The solid stick is sometimes used in ulcerations of the throat, and chilblains. If the pain be excessive from the application of the nitrate, it may be at once relieved by washing the parts with a solution of common salt, which decomposes it, and converts it into the insoluble chloride of silver. The same article is an antidote to its poisonous effects when taken internally in too large doses.

ARISTOLOCHIA SERPENTARIA.

Virginia Snakeroot.

Nat. Ord.—Aristolochiaceæ. *Sex. Syst.*—Gynandria Hexandria.

ROOT.

Description.—*Aristolochia Serpentaria*, also called *Snakeroot*, and *Snakeweed*, is a perennial herbaceous plant, with a short, horizontal,

knotty, brown caudex, which sends out numerous, slender fibers. The *stems* are erect, flexuous, round, jointed, slender, about eight or ten inches in height, of a reddish or purple color near the base, and rise singly or severally from the same root. The *leaves* are alternate, petiolate, oblong, entire, acuminate at apex, cordate, and three-nerved at base, surface more or less pubescent, and of a pale yellowish-green color. The *flowers* proceed from the joints near the root, and stand singly on long, slender, round, jointed peduncles, which are somewhat scaly, and curve downward so as nearly to bury the flower in the earth, or among the decayed leaves; they have a stiff, leathery texture, and a dull brownish-purple color. The *peduncle* which supports them has one or more bracts, and gradually enlarges into a furrowed obovate ovary. The *calyx* is of a dull-purplish, or reddish color, with a long, contorted tube, bent in the form of the letter S, swelling at its two extremities, having its throat surrounded by an elevated edge or brim, and its border expanded into a broad, irregular margin, forming an under and upper lip, which are closed in a triangular manner in the bud. *Corolla* none. *Anthers* six or twelve in number and sessile, oblong, obtuse, and attached to the sides or under part of a large, round, sessile *stigma*, which is divided into six parts, and supported by a short fleshy style upon an oblong, angular, hairy, inferior germ. The fruit is an obovate, hexangular, six-celled capsule, with numerous small, flat seeds.

History.—Several species of *Aristolochia* are confounded in the drug market with the above, but as they are all nearly identical in medical properties, it is of but little importance; still a brief notice of them may be proper:

A. Hirsuta.—*Stem* flexuous, jointed, erect, pubescent; *leaves* alternate, large, cordate, rounded, obtuse, *upper ones* abruptly acuminate, very pubescent, with prominent veins; *peduncles* sub-radical, scaly, one-flowered, hirsute. *Calyx* also pubescent. This species grows in the Southern States, to which market it is more common, being seldom brought to the north; the roots resemble in taste and color, the *A. Serpentaria*.

A. Hastata, of Nuttall, or *A. Sagittata*, of Muhlenberg.—*Stem* flexuous, simple, erect; *leaves* mostly subcordate, hastate, acute, or attenuated, sublanceolate, auriculate; *peduncles* nearly all radical; *lip of the corolla* ovate. Some doubt has been expressed about viewing this as a distinct species; it grows in the Southern States, and is frequently found mixed with the officinal plant.

A. Reticulata.—*Stems* numerous, short, slender, round, flexuous, jointed, simple, but sometimes branched near the root; when young very pubescent, but slightly villous when old. *Leaves* on short, villous petioles, oblong, cordate, large, obtuse, reticulated with very prominent

veins, and villous on both sides, especially upon the veins. *Peduncles* subradical, hairy, scaly, several-flowered. *Flowers* on short pedicels, small, purplish, very pubescent. *Capsule* hexagonal, deeply sulcate, somewhat hirsute. This species is one of recent introduction, and is much in use; it is derived from Louisiana, Arkansas, and other south-western locations; it differs from the officinal root, in having larger fibers and which are less interlaced, but is fully equal to it as a medicine.

A. Tomentosa.—*Stem* twining, ascending to the tops of the tallest trees; *leaves* roundish, cordate, villous beneath; *peduncles* solitary, axillary, ebracteate; *calyx* densely villous; *limb* trifid, greenish-yellow, orifice oblique and gaping; *margin* elevated, dark-purple, rugose; *inner part of tube* white, with purple spots; *stigmas* three. This species is found in Carolina and the south-western States; its root is thick, creeping, and coarser than the officinal, and is less aromatic than that of the other species just named.

The *Aristolochia Serpentaria* is found in the middle, southern, and western States, growing on hill sides, and in rich, shady woods; it flowers in May and June. As found in the shops, the root is in tufts of slender, long, matty brittle fibers, attached to a short, knotted, rugged head. The color of the recent root is yellowish, but becomes brown by age; its powder is grayish. The odor is pungent, camphoraceous, and agreeable, and the taste warm, bitter, and also camphoraceous. Water, alcohol, or proof spirit, extracts the medical principles; its alcoholic tincture being greenish, its aqueous infusion yellowish-brown. Analysis has found in it, a green, fragrant oil, a yellowish-green resin, extractive, gum, albumen, lignin and some salts. The oil exists more largely in the *A. Reticulata*, which is the most powerful of this family of plants.

Virginia Snakeroot is sometimes adulterated with the roots of *Spigelia Marilandica*, and the young roots of *Polygala Senega*; the first may be known by their want of the bitter taste, as well as by the difference in the stem and leaves, when present; the latter, by their difference in odor and taste, by being single, and by the projecting line running from one end of the root to the other.

Properties and Uses.—Stimulant tonic, diaphoretic, or diuretic, according to the manner of its administration. In warm infusion it produces diaphoresis, and is beneficial in adynamic eruptive fevers, where the eruption is tardy, or has receded. In typhoid febrile conditions, in cases where active stimulation cannot be borne, it will be found very available. It has been employed successfully in periodic fevers in conjunction with sulphate of quinia. As a gargle the infusion is sometimes valuable in malignant sore-throat. In dyspepsia it has been employed as a tonic, and has proved useful in amenorrhea. If taken too long it occasions gripings, nausea, vomiting, and dysenteric tenesmus. Long boiling

impairs its virtues. A cold infusion is useful in convalescence from fevers. Dose of the powder, ten to thirty grains; of the decoction, one to two fluidounces; tincture, one to two fluidrachms.

Off. Prep.—Infusum Serpentariæ; Extractum Serpentariæ Fluidum; Tinctura Serpentariæ Composita.

ARNICA MONTANA.

Leopardsbane.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE ROOT AND HERB.

Description.—Arnica Montana, is a perennial, herbaceous plant, with a horizontal, woody, blackish or brownish root, which terminates abruptly at the lower end, and which is furnished with many long, slender, dark-colored fibers. The stem rises about a foot in height, is simple, obscurely-angled, striated, rough, hairy, and terminates in one, two, or three upright peduncles, each bearing one very large flower of a deep yellow color, somewhat tinged with brown. The radical leaves are ovate, entire, ciliated, and obtuse; the cauline ones are lanceolate, and in opposite pairs; both are bright-green, and slightly pubescent on their upper surface. The involucre is cylindrical, and composed of fifteen or sixteen rough, hairy, lanceolate scales, of a dingy-green color, but purple at the points. The disk florets are very numerous, tubular, with a five-lobed limb; those of the radius, about fourteen, ligulate, striated, three-toothed, and hairy at the base. The achenia are oblong, blackish, hairy, and crowned with a straw-colored capillary pappus.

History.—This plant is a native of the mountainous districts of Europe and Siberia, in moist, shady situations, flowering in June and July; it is likewise found in the northern regions of this continent, west of the Mississippi. The flowers, leaves, and root, have been used in medicine, but the flowers are generally preferred. When fresh, the whole plant has a disagreeable odor, very strong when fresh, and exciting sneezing; the taste is acrid, bitterish, and permanent. Its virtues are extracted by water. Analysis has detected in the flowers, gallic acid, gum, albumen, yellow coloring matter, an odorous resin, a blue volatile oil, some salts, and a bitter, acrid matter, supposed to be identical with *cytisin*, the bitter principle of *Cytisus Laburnum*. *Cytisin* is a yellow substance, of a bitter, nauseous taste, deliquescent, readily soluble in water and dilute alcohol, less soluble in strong alcohol, and insoluble in ether. Five grains of it are powerfully emetic and cathartic.

Arnica is obtained from the flowers, by subjecting them to a process similar to that by which lobelina is extracted from *lobelia inflata*. It has a decided alkaline reaction, and combines with acids, forming a series of salts. It has a slightly bitter, but not acrid taste, with an odor of castor, and from the aqueous solutions of its salts, it is precipitated by tincture of galls in somewhat dense flocks; it is more readily soluble in alcohol and ether, than in water. A high temperature decomposes it, which also obtains when subjected to the action of caustic alkalies. It has not yet been employed in medicine, though it probably possesses the active principles of the *Arnica* in a concentrated form.

Properties and Uses.—In large doses, it causes heat in the throat, nausea, vomiting, spasmodic contractions of the limbs, difficulty of respiration, and sometimes inflammation of the alimentary canal, and coma. Its poisonous effects are best counteracted by the free use of vinegar, or other dilute vegetable acid.

In small doses, it accelerates the pulse, increases the perspiration, excites a flow of urine, and is said occasionally to cause headache and giddiness. In Germany, it is esteemed as a stimulant in typhoid fever and other adynamic febrile diseases, in chronic palsy, and amenorrhea; also, as a tonic in chronic rheumatism, and as a tonic and diuretic in the asthenic forms of dropsy. In intermittent fever it has proved very successful, also, in nyctalopia and amaurosis; and is reputed to be highly serviceable in that disordered condition of the system which succeeds concussion of the brain, from falls, blows, etc. It has also been recommended in diarrhea, dysentery, nephritis, gout, chlorosis, and almost every disease where there is debility, torpor, or inactivity of function. Externally, it is used in the form of a fomentation, or diluted tincture of the flowers, both to prevent and discuss local inflammations, and to remove ecchymosis.

Dose of the powder, five to ten grains, two to four times a day; of the infusion, made by adding half an ounce of the flowers to a pint of water, from half an ounce to an ounce; of the extract, which is an excellent form of administration, from five to ten grains, four or five times a day. In preparing an infusion of the flowers, they should be loosely tied in a bag, in order to prevent the down or fine fibers from getting into the infusion, or else they will cause troublesome irritation of the throat, nausea, and vomiting.

Off. Prep.—*Infusum Arnicae*; *Tinctura Arnicae*.

ARTEMISIA ABSINTHIUM.

Wormwood.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

TOPS AND LEAVES.

Description.—*Artemisia Absinthium* is a perennial suffruticose plant, with a woody root branched at the crown, and having numerous fibers below. The whole herb is covered with close, silky hoariness; the stems are numerous, bushy, growing from one to two feet in height, round furrowed, and paniced at their summit. The lower portion of the stem lives several years, and annually sends up herbaceous shoots, which perish in the winter. The radical leaves are doubly or triply pinnatifid, with lanceolate, obtuse, dentate divisions; the cauline ones, doubly or simply pinnatifid, with lanceolate, somewhat acute divisions; floral leaves lanceolate; all are canescent. The flowers are of a brownish-yellow color, hemispherical, pedicelled, nodding, and in erect racemes; florets of the disk numerous; those of the ray few. External scales of involucre, linear or lanceolate, silky; the inner broad, rounded and scarious. Styles very deeply cloven. Receptacle convex, clothed with fine upright hairs.

History.—A native of Europe, but cultivated in this country. It flowers in July and August. The whole plant has a strong, fragrant odor, and an intensely bitter, aromatic taste. Alcohol, or water, takes up its active principles. It contains a volatile, bitter, acrid oil, absinthic acid, several salts, etc.

Absinthine, the bitter principle of *A. Absinthium*, may be obtained as follows: Exhaust the dry herb, with alcohol of 0.863, and distil the clear liquid to the consistence of a syrup, transfer the residue into a glass-stoppered bottle, and shake it well with ether. After some time this separates with a yellowish-brown color; and this treatment with ether is to be repeated until it no longer has a very bitter taste. The ethereal liquid is to be distilled in a water bath; the residue will consist of a viscid mixture of a blackish-brown acid resin, and absinthine. Treat it with water to which a few drops of ammonia have been added, and the black smeary resin will be principally taken up, and the greater portion of the absinthine be left behind. In proportion as it becomes purer it acquires a pulverulent form. On adding a further quantity of ammonia, the absinthine is also dissolved; but on triturating with concentrated ammonia, far less passes into solution, because the compound of ammonia with absinthine is very sparingly soluble in ammonia. To remove the ammonia, digest it with dilute hydrochloric acid, then wash it with water, dissolve it in alcohol, and add solution of acetate of lead to it as long as any turbidity results, then filter, and pass sulphureted

hydrogen into the liquid to decompose the excess of the lead salt. The alcoholic solution is to be filtered from the sulphide of lead, mixed with a small quantity of water, and allowed to evaporate slowly in a warm place when the absinthine separates in yellow resinous drops. These are soft, and when mixed with water, become coated with an opaque membrane, and in the course of some weeks all the drops become converted into hard masses, which are jagged and rough externally, and internally are radiate and indistinctly crystalline.

Absinthine thus obtained is yellow, or brownish-yellow; its powder is yellowish, of a faint, disagreeable, bitter odor of wormwood, an intensely bitter taste, and dissolves readily in alcohol, concentrated acetic acid, solutions of ammonia, and caustic potassa, sulphuric and hydrochloric acids. It is less soluble in ether, hardly at all in water, but melts in boiling water. It has not been much used in medicine, but probably possesses the medicinal principles of the plant, and may be found tonic, hepatic and anthelmintic.

Properties and Uses.—Anthelmintic, tonic, and narcotic. Used in intermittent fever, jaundice, and worms. It is also used to promote the appetite in atonic dyspepsia, amenorrhea, chronic leucorrhea, obstinate diarrhea, etc. Combined with a fixed alkaline salt, it proves powerfully diuretic. Externally it is very useful in fomentations for bruises and local inflammations, and has also been advised as an external application in chronic affections of the abdominal viscera, either in the form of tincture, infusion, or poultice. In large doses, wormwood produces gastric irritation, and excitement of the circulation. Dose of the powder, ten to twenty grains; infusion, one to two ounces.

The *Artemisia Abrotanum* (southernwood) *A. Santonica*, and *A. Vulgaris*, (mugwort) possess similar properties. The *A. Vulgaris*, has been reputed beneficial in epilepsy, hysteria, and amenorrhea. *Santonin*, or *Santonicin*, is a peculiar white crystallizable principle, derived from the *A. Santonica*, and some other species; it is soluble in ether and alcohol, and is very efficacious as a vermifuge, given in doses of three or four grains, twice a day. The high price of santonin, and the difficulty experienced in obtaining it pure, has induced M. Gaffard to endeavor to obtain from the wormseed a product which may possess the advantages of the former, and at the same time be free from the objections to the use of the latter. This product he calls *Brown* or *Impure Santonin*; it is obtained as follows: Take of Aleppo wormseed three ounces; carbonate of potassa one ounce; slaked lime, sifted, half an ounce; water from three to three and a half pints. Place the mixture on the fire, stirring occasionally with a wooden spatula; let it boil for half an hour; on removing it from the fire, pass it with expression through a linen cloth; let it settle, decant and add hydrochloric or nitric acid until it reddens litmus without being sensibly acid to the tongue. Allow it to rest, pass it through a filter previously moistened, or through a piece of close

canvas, and allow the product which remains on the filter to dry in the open air, until it acquires the consistence of firm butter. This product, which is a mixture of santonin, resin, and essential oil, will answer for the various pharmaceutic forms in which the practitioner may wish to exhibit it. M. G. gives it in the form of lozenges, composed as follows: Place in a marble mortar, brown santonin three drachms; add by degrees, and with constant trituration, powdered sugar thirteen ounces, mixed with powdered gum one ounce and a half, and oil of lemon twenty-five drops, so as to make a homogeneous powder. Form with a sufficient quantity of water a mass of the desired consistence, and divide into lozenges, each of which shall weigh, when dried, fifteen grains; each lozenge will then contain somewhat more than one-third of a grain of brown santonin. For infants under six months, the dose is one lozenge night and morning; from six months to a year, two lozenges; from one to two years, three lozenges; from two to four years, four, night and morning; for those older, an extra lozenge for each year, to be given night and morning, and continued until the desired effects are produced, in every instance.

M. Lecocq obtains santonin by taking one part of semen-contra of Aleppo reduced to coarse powder, and boiling it for a quarter of an hour with ten parts of water, after which a sufficient quantity of slaked lime is added to render the liquor slightly alkaline; it is again boiled for ten minutes, then strained through a cloth, and the residue pressed. If it is not considered sufficiently exhausted, which may be ascertained by its leaving in the mouth the hot and pungent taste of semen-contra, it is boiled again with five quarts of water and a little slaked lime; it is then strained, and the residue submitted to pressure. The united liquors are evaporated until they do not weigh more than the semen-contra employed; they are then placed into a stone-ware pot, allowed to cool, and then treated with an excess of hydrochloric acid. A fatty and resinous matter instantly separates, in thick flakes, which float, and santonin is precipitated as an impalpable powder; it is strained through a fine cloth; the santonin passes with the liquor, and the resinous matters remain on the cloth. This substance, which contains only very little santonin is rejected. After a day's repose, the impure santonin is deposited at the bottom of the vessel. It is washed with distilled water, and purified by combining it anew with lime. For that purpose, it is put into a porcelain capsule, with about two quarts of distilled water, and boiled. A certain quantity (50 to 60 grammes) of pulverized quicklime is then added to it, and the combination is effected in a short time. The liquor is filtered and decolorized with animal charcoal, and then treated with hydrochloric acid, which immediately precipitates the santonin; collect this on a paper filter, and wash it with distilled water until the washing water does not redden litmus paper, and dry in a stove secured from the light. Thus obtained, santonin occurs in pearly-white bractææ, of great

brilliancy, and promptly becomes colored by light; it is therefore essential to keep it in a black glass flask and well corked.

It is important for the success of the above operation not to add an excess of lime in combining the impure santonin with this base, for the bibasic salt of santonin is very sparingly soluble in water; it is better to leave a slight excess of santonin; which will remain on the filter and which may be treated anew with lime.

Off. Prep.—Absinthine; Infusum Absynthii.

ARUM TRIPHYLLUM.

Dragonroot.

Nat. Ord.—Araceæ. *Sex. Syst.*—Monœcia Polyandria.

CORMUS OR ROOT.

Description.—*Arum Triphyllum* (*Arisæma Triphylla*) is variously called *Wake Robin*, *Indian Turnip*, *Jack-in-the-pulpit*, etc. It has a round, flattened, perennial root or *cormus*, the upper part of which is tunicated like the onion, and the lower and larger portion tuberous and fleshy, giving off numerous, long white radicles in a circle, from its upper edge; the under side is covered with a dark, loose, wrinkled epidermis. Early in the spring a large *spathe* grows up, which is ovate, acuminate, convoluted into a tube at the bottom, flattened and bent over at the top like a hood, varying in color internally, being green, dark-purple, black, or variegated, with pale-greenish stripes on a dark ground, and supported by an erect, round, green, purple, or variegated *scape*, invested at the base by the petioles and their acute sheaths. Within the spathe is a club-shaped spadix, shorter than the spathe, rounded at the end, green, purple, black, or variegated, contracted into a narrow neck at the base, where it is surrounded by the stamens or germs. In the fertile plants, it is invested with roundish crowded ovaries each tipped with a stigma; in the barren, its base is covered with conical, fleshy filaments, each bearing from two to four circular anthers. Plants which are perfectly monœcious, and which are the least common, have stamens below the ovaries. The upper portion of the spadix gradually decays, together with the spathe, while the ovaries are converted into a large compact bunch of shining, scarlet berries. The *leaves* are usually one or two in number, standing on long sheathing footstalks, ternate; the *leaflets* oval, mostly entire, acuminate, smooth, paler on the under-side, becoming glaucous as the plant grows, and the two lateral ones somewhat rhomboidal.

History.—This plant is common to North and South America, growing in all moist and damp situations, and flowering from May to July.

The whole plant is acrid, but the root is the only part employed; it is about an inch or two in diameter, turnip-shaped, dark externally, and white, fleshy, and solid internally. When fresh, it is very acrid, causing when chewed, an intense burning and biting sensation in the mouth and fauces, which is persistent, and leaves a subsequent soreness; milk relieves this sensation, considerably modifying its intensity. It exerts no such influence upon the external skin except upon long and continued application. The acrid principle is highly volatile, is not taken up by water, alcohol, the acids, or oil, and is wholly dissipated by heat. It becomes inert by age, and should always be used in the recent state, or when but partially dried; if buried in sand, its activity may be preserved for twelve or fifteen months. In addition to its acrid principle, it contains albumen, gum, sugar, starch, extractive lignin, and salts of potassa and lime. A very white, delicate and nutritive amylaceous substance can be prepared from it, resembling the finest arrowroot. It is too acrid for use when taken immediately from the ground.

Properties and Uses.—Acrid, expectorant, and diaphoretic. Recommended in flatulence, asthma, pertussis, chronic catarrh, chronic rheumatism, bronchitis, pains in the chest, aphthous sore-mouth, colic, low stage of typhus, and various affections connected with a cachectic state of the system. Externally it has been used in scrofulous tumors, tinea capitis, and other cutaneous diseases. Dose, of the powder, ten grains two or three times a day, gradually increased; it may be taken in syrup, honey, or gum arabic emulsion.

Off. Prep.—Emplastrum Picis Compositum.

ASARUM EUROPÆUM.

Asarabacca.

Nat. Ord.—Aristolochiaceæ. *Sex. Syst.*—Dodecandria Monogynia.

ROOT AND LEAVES.

Description.—This plant, sometimes called *Hazelwort*, or *Wild Nard*, has a creeping root or rhizoma, entangled, with numerous, stout, branching fibers. The stems are very short, simple, round, herbaceous, pubescent, each bearing two dark-green, shining, reniform, obtuse, entire, somewhat downy leaves, which are opposite, two inches wide, and on long, downy footstalks; also one drooping flower, not an inch long, fleshy, of a dusky-purple color, and placed upon a short terminal peduncle. The calyx is campanulate, greenish at the base, divided into three pointed purplish segments, which are erect, and turned inward at their extremity. Corolla wanting. The filaments are twelve, and prolonged beyond the anthers into a small hook. The style is surmounted

by a six-parted reddish stigma. The *fruit* is a six-celled capsule, coriaceous, and crowned with the persistent calyx.

History.—This is a European plant, growing in woods and shady places. It flowers in May. The whole plant is usually employed, which, when recent, is quite acrid. The root is about the size of a goosequill, quadrangular, knotted, grayish, and occasionally with fibers at each joint. Its odor resembles pepper, and its taste is acrid; the leaves are bitter, acrid, nauseous, and slightly aromatic. The powder of the root is grayish, of the leaves yellowish-green. Their virtues are taken up by water or alcohol, but dissipated by boiling, and impaired by age. Analysis has found in the root, a liquid volatile oil, two concrete volatile substances called *Asarum Camphor* or *Asarone*, and *Asarite*, a peculiar bitter principle called *Asarin*, tannin, extractive, resin, starch, gluten, albumen, lignin, citric acid, and various salts; in the *leaves* are asarin, tannin, extractive, chlorophylle, albumen, citric acid, and lignin. The volatile oil is yellow, of an acrid, burning taste, valerian-like odor, glutinous, and lighter than water; the asarin is soluble in alcohol, and is probably identical with cytisin. The root and leaves of this plant should always be carefully dried for preservation.

Properties and Uses.—Emetic, cathartic, and errhine. Used principally as an errhine in headache, chronic ophthalmia, rheumatic and paralytic affections of the face, mouth and throat. Internally, it is a stimulant in doses of ten or twelve grains; and emetic in half drachm or drachm doses. Said to be used in France by drunkards to produce vomiting.

ASARUM CANADENSE.

Wild Ginger.

Nat. Ord.—Aristolochiaceæ. *Sex. Syst.*—Dodecandria Monogynia.

ROOT.

Description.—*Asarum Canadense*, likewise called *Indian Ginger*, *Coltsfoot*, *Canada Snakeroot*, has a close resemblance to the *A. Europæum*. The *rhizoma* is long, creeping, fleshy, jointed, yellowish, and furnished with radicles of a similar color. The *stem* is very short, dividing before it emerges from the ground into two long round hairy leafstalks, each of which bears a broad, reniform *leaf*, pubescent on both sides, light-green and shining above, veined and pale or bluish below. The *flower* is solitary, growing from the fork of the stem, upon a pendulous, hairy peduncle, being often concealed by the loose soil, or decayed vegetable matter around it. The *calyx* is very woolly, consisting of three broad concave, acuminate segments, of a brownish, dull-purple or greenish color on the inside, at top and bottom, depending on the

amount of light which the plant enjoys, and terminated by a long, spreading, inflected point, with reflexed sides. *Corolla* wanting. *Filaments* twelve, unequal in length, inserted upon the ovary, and rise with a slender point above the anthers, which are attached to their sides just below the extremity. *Ovary* inferior, somewhat hexagonal; *style* conical, striated, and parted at top into six recurved, radiating stigmas. *Capsule* six-celled, coriaceous, and crowned with the adhering calyx.

History.—Wild Ginger is a native of the United States, growing in woods and shady places, and flowering from April to July. The whole plant has a grateful aromatic odor, and bitter, but agreeably aromatic taste. The root is the officinal part, and yields its active principles to alcohol, and partially to water. It is in long, contorted pieces, varying in thickness from a line to four or five lines in diameter, brownish and wrinkled externally, internally hard, brittle, and whitish. It contains a light-colored, pungent, and fragrant essential oil, a reddish, bitter resinous matter, starch, gum, fatty matter, chlorophylle, and salts of potassa, lime, and iron.

Properties and Uses.—Aromatic stimulant, tonic, diaphoretic, and expectorant. Used in colic and other painful affections of the stomach and bowels where no inflammation exists, and in chronic pulmonary affections. Used also as an errhine. Dose of the powder, half a drachm; of the tincture half a drachm to two drachms. It may be advantageously added to tonic infusions and tinctures.

Off. Prep.—Tinctura Lobeliæ Composita.

ASCLEPIAS INCARNATA.

Swamp Milkweed.

Nat. Ord.—Asclepiadaceæ. *Sex. Syst.*—Pentandria Digynia.

ROOT.

Description.—This plant is known by various names, as *Swamp Silkweed*, *Flesh-colored Asclepias*, *Rose-colored Silkweed*, *White Indian Hemp*, etc. It has a smooth, erect *stem*, with two downy lines above and on the branches and peduncles, branching above, and about two or three feet high. The *leaves* are opposite, oblong-lanceolate, acute, or pointed, obtuse at the base, on short petioles, and slightly tomentose. The *flowers* are red or reddish-purple, sweet-scented, and disposed in numerous *umbels* which are crowded, erect, mostly terminal, and often in opposite pairs. *Hoods of the crown* entire, *horns* exsert, subulate. The leaves are four to seven inches long, and from one half an inch to an inch and a half wide; umbels are from two to six, on a peduncle two

inches long, and consist of from ten to twenty small flowers. There are several varieties of this plant, the *A. Pulchra*, which is more hairy, with broader and shorter petioled leaves; the *A. Glabra*, which is almost glabrous, with two opposite longitudinal hairy lines on the stem, and leaves glabrous, with rough margins, midrib glandular below; and the *A. Alba* which has white flowers.

History.—This plant grows in damp and wet soils throughout the United States, and bears red flowers from June to August. It emits a milky juice on being wounded. The root is the officinal part; it varies in thickness from one to six lines, and is of a light-yellowish or brownish color. It imparts its properties to water.

Properties and Uses.—Anthelmintic, for which purpose the powder may be used in doses of ten to twenty grains, three times a day; or the decoction two to four ounces. Prof. Tully recommends it in catarrh, asthma, syphilis, rheumatism, and worms. Reputed to be emetic and cathartic. It is undoubtedly a valuable agent, and worthy further investigation.

ASCLEPIAS SYRIACA.

Common Silkweed.

Nat. Ord.—Asclepiadaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—*Asclepias Syriaca*, (the *Asclepias Cornuti* of Decaisne,) known as *Milkweed* in many parts of the country, has a large, stout, simple, somewhat branched stem, growing from two to five feet high. The leaves are opposite, oblong-lanceolate, petiolate, gradually acute, and tomentose beneath. The flowers are large, and sweet-scented, arranged on several umbels, which are axillary, subterminal, nodding, dense, globose, each of twenty or more flowers. *Calyx* segments lanceolate. *Corolla* pale or greenish-purple, reflexed, leaving the corona, which is of nearly the same hue, quite conspicuous. But few of the flowers prove fertile, producing oblong, pointed pods or follicles covered with sharp prickles, which contain a mass of long, silky fibers with seeds attached, and which fibers have been used for beds, pillows, and in the place of fur in manufacturing hats.

History.—Very common to the United States, growing in sandy fields, on roadsides, and on banks of streams. It bears whitish-purple flowers in July and August. The plant also gives out a milky juice when wounded. It contains water, wax-like fatty matter, caoutchouc, gum, sugar, with various salts. A crystalline resinous substance, allied to

lactucone, has been obtained from the juice of the *A. Syriaca*, to which the name of *Asclepione* has been given. To obtain it, the juice must be coagulated by heat, then filtered, to separate the liquid portion, and then digested with ether, which dissolves the asclepione, and yields it by evaporation. To purify it, treat the residue repeatedly with anhydrous ether, which leaves another substance undissolved. Asclepione is white, crystalline, tasteless, inodorous, fusible, insoluble in water or alcohol, soluble in ether, oil of turpentine, or concentrated acetic acid; potassa in a hot strong solution does not affect it.

Properties and Uses.—Anodyne, emmenagogue, diuretic and alterative. Useful in amenorrhea, dropsy, retention of urine, dyspepsia, asthma, cough, dyspnoea, also, in scrofulous and rheumatic disorders. Both the root and inspissated milky juice possess anodyne properties. Dose of the powder, ten to twenty grains; of the decoction, two to four ounces; of the tincture, ten to sixty minims.

ASCLEPIAS TUBEROSA.

Pleurisy Root.

Nat. Ord.—Asclepiadaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This plant has several names by which it is known in various parts of the country, as *Butterfly-weed*, *Windroot*, *Tuber-root*, *Asclepias*, etc.; but it is most commonly described as *Pleurisy-root*. It has a perennial, large, fleshy, branching, white, and sometimes fusiform-like root, from which numerous stems arise, growing from one to three feet high; these are erect, or more or less procumbent, round, hairy, green or red, and growing in bunches from the root. The leaves are alternate, the lower ones pedunculated, the upper sessile, vary from linear to oblong-lanceolate, hairy, dark-green above, paler beneath, waved on the edge, and in the old plants sometimes revolute. The flowers are numerous, erect, of a beautifully bright-orange color, and are disposed in terminal, rarely lateral, corymbose umbels, with an involucre of numerous, linear, subulate bracts. The calyx is much smaller than the corolla, five-parted; the segments subulate, reflexed, and concealed by the corolla. Corolla rotate, five-parted, the segments oblong and reflexed. The staminal crown has five erect, cucullate leaves or cups, with an oblique mouth, having a small, incurved, acute appendage or horn, proceeding from the base of each, and meeting at the center of the flower. The mass of stamens is a tough, horny, somewhat pyramidal substance, separable into five anthers; each two-celled, bordered by membranous, reflected edges contiguous to those of the next, and

terminated by a membranous, reflected summit. *Pollen masses* ten, distinct, yellowish, transparent, flat and spathulate, ending in curved stalks, which unite them by pairs to a minute dark tubercle at top; each pair is suspended in the cells of two adjoining anthers, so that if a needle be inserted between the membranous edges of two anthers and forced out at top, it carries with it a pair of the pollen masses. *Carpels* two, completely concealed beneath the stigma and anthers, ovate, with erect styles, terminated by a flat, pentagonal disk-like stigma. *Follicles* two, often one or both abortive, long, narrow, acuminate, green, with a reddish tinge and downy. Seeds ovate, flat, margined, and terminated by long silken hairs.

History.—This is an indigenous plant, growing in gravelly and sandy soils, but most abundant in the south, and flowering in July and August. Unlike the other species of *Asclepias*, this plant does not emit a milky juice when wounded. The root is the officinal part, which when fresh has a subacid, nauseous taste, but when dried it is easily pulverized, and has a bitterish but not disagreeable taste. Boiling water or alcohol extracts its virtues.

Properties and Uses.—Diaphoretic and expectorant, without stimulating; likewise said to be carminative, diuretic, tonic, and antispasmodic. Principally used in decoction or infusion in pleurisy, pneumonia, catarrh, febrile diseases, acute rheumatism, and dysentery; in which it is administered warm to promote diaphoresis, without increasing the temperature of the body. In flatulency and indigestion, it is efficient, and when combined with the *Dioscorea Villosa*, it is very beneficial in all cases of flatus in adults and children. A number of cases of prolapsus uteri have been cured under the use of one ounce of pleurisy-root mixed with half an ounce of the root of *Aletris Farinosa*, and given in drachm doses, three times a day. In uterine difficulties this plant deserves further investigation. It is, undoubtedly, one of our most useful agents. Dose of the powder, one scruple to one drachm, three or four times a day; of the decoction or infusion, a teacupful, every hour or two, until diaphoresis is produced.

Two concentrated preparations are obtained from this article, termed *Asclepidin* and *Ascletine*. The former was first manufactured by Mr. W. S. Merrell, the latter by some chemists in N. York; of the particular method of preparing the latter, we have been unable to get any account. The *asclepidin* is a dark, semiliquid mass, and is prepared by evaporation or distillation of the saturated tincture in water, similar to the plan pursued for obtaining cimicifugin. It may be used for all purposes to which the crude article is applied in doses of from one to five grains, three or four times a day, or as may be indicated.

A pill composed of equal parts of *asclepidin* and *dioscorein*, will be found very beneficial in flatulency, borborygmi, and where persons are

subject to flatulent and bilious colic. In some cases, especially of long standing, the addition of pulverized African ginger will much improve its efficacy.

Ascletine is said to be the active principle of the plant; it is a beautiful, white powder, with but little taste or odor, soluble in water, but insoluble in alcohol. It is recommended in the same diseases in which the root is employed, to fulfill similar indications, in doses of from one to three grains, three or four times a day.

Off. Prep.—Extractum Asclepidis Hydro-alcoholicum; Infusum Asclepidis; Pulvis Asclepiæ Compositus; Pulvis Ipecacuanhæ Compositus; Tinctura Lobeliæ Composita; Asclepidin.

ASPARAGUS OFFICINALIS.

Asparagus.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE YOUNG SHOOTS.

Description.—*Asparagus officinalis* is a perennial plant, with an erect, herbaceous, unarmed, terete, very branching stem, from two to four feet high. The leaves are setaceous, flexible, fasciculate, filiform, of a pale pea-green color and from half an inch to one and a half inches long; flowers axillary, solitary, or in pairs. Berries globose, red, three-celled. Cells two-seeded.

History.—This plant is a native of Europe and is extensively cultivated there, as well as in the United States, as an article of diet. The root is inodorous, and has a weak sweetish taste; when dried it is inert. The young shoots or turiones, which are much used as food, have a disagreeable taste, which is removed by boiling with water; their juice contains a crystallizable principle called *Asparagin* or *Asparamide*.

Properties and Uses.—Diuretic. A syrup or an extract prepared from the young shoots, in doses of one or two fluidounces of the former, or from half a drachm to a drachm of the latter, is said to greatly increase the quantity of urine, and is reputed very beneficial in repressing an undue excitement of the circulatory system, and recommended for this purpose in hypertrophy of the heart, and other diseases of that organ, attended with excessive action, and without phlogosis of the stomach.

ASPIDIUM FILIX MAS.

Male Fern.

Nat. Ord.—Filices or Filicaceæ.—Polypodiaceæ. *Sex. Syst.*—Cryptogamia Filices.

RHIZOMA.

Description.—Male fern has a large, perennial, horizontal, scaly root or *rhizoma*, from which numerous fronds or leaves arise, forming tufts from a foot to four feet in height. The *fronds* are erect, disposed in a circle, oval, lanceolate, acute, pinnate, bright-green, and leafy nearly to the bottom; their *stalks* and *midribs* having tough, brown, transparent scales throughout; divisions alternate, taper-pointed, pinnate; the *pinnæ* or *leaflets* numerous, crowded, sessile, for the most part distinct, occasionally somewhat combined at the base, oblong, obtuse, crenate throughout, the lateral notches broadest and most shallow, the terminal ones more crowded and acute, without any terminal bristles; both sides smooth, and destitute of glandular globules, but a depression on the upper one over the insertion of each sorus. *Sori* circular, tawny, ranged in simple, close, short rows, near the partial midrib, and scarcely occupying more than the lower half of each leaflet. *Indusium* circular, durable, crenate, tumid, with a cleft terminating in the central depression. *Thecæ* numerous, shining-brown, prominent all round for a little beyond the indusium.

History.—Found growing in all parts of Europe, and indigenous, growing in shady pine forests, from New York to Virginia. The root or *rhizoma* is the officinal part; the best are about six inches long, and an inch broad; externally it is of a brown color, internally yellowish or reddish-white, with a peculiar, but not very strong odor, and a sweetish, bitter, nauseous and astringent taste. It should be collected between the end of May and middle of September; cleansed, without being washed; then dried quickly in the shade and open air without heat, those parts selected which are greenish, internally, immediately pulverized, and then kept in well-closed bottles. The powder is of a pale greenish-yellow color, and has a peculiar, earthy, disagreeable odor, and a nauseously sweet taste, followed by some bitterness and astringency. It loses its virtues in two years. An ethereal oil is obtained by evaporating or distilling off the ether from an ethereal tincture.

It is a thick, dark, liquid, with the odor and taste of the root, though somewhat acrid, and contains volatile oil, resin, coloring matter, etc. The purer the ether used, the less resin is taken up. Male fern root contains a volatile oil, a fixed oil, resin, gallic and acetic acids, uncrySTALLIZABLE sugar, tannin, starch, a gelatinous matter insoluble in water and alcohol, lignin, and various earthy and saline matters.

Properties and Uses.—Anthelmintic. Used solely for the removal of worms, especially the tapeworm. It is said to be more effectual in removing the tapeworm of Switzerland (*Bothriocephalus latus*) than the *Tenia solium*, the most frequent variety in France and England. The best mode of administration is the ethereal oil or extract, of which eighteen grains, or from twelve to twenty-four drops may be given in the form of pill or emulsion, at night, and again in the morning; two hours after the administration of the last dose, a purgative dose of castor oil is to be taken, and the worm is discharged dead, without any severe or unpleasant symptoms. Dose of the powder, one to four drachms; of the ethereal tincture of the buds, eight to thirty drops, and which is made by digesting one part of the buds, in eight parts of ether.

ASTRAGALUS VERUS.

Tragacanth.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Diadelphia Decandria.

THE CONCRETE JUICE.

Description.—This is a small shrub about two or three feet in height, with a stem about an inch in thickness, and numerous, very closely crowded branches, covered with imbricated scales, and spines which are the remains of former petioles. The leaves are a little more than half an inch long, and consist of from sixteen to eighteen opposite, villous, stiff, pointed, linear, hispid leaflets, with a midrib terminating in a sharp yellowish point; stipules at first downy, afterward smooth. The flowers are small, yellow, axillary, in clusters of from two to five, sessile, papilionaceous, and furnished with cottony bracts. Calyx tomentose, obscurely five-toothed.

History.—TRAGACANTHA or Tragacanth is obtained from several species of plants, belonging to the genus *Astragalus*. The *A. Tragacantha* of Linnæus, now the *A. Massiliensis* of Lamarek, a tree growing in southern Europe and northern Africa, and which yields no gum, was formerly referred to as affording the drug, but this is now known to be incorrect. The greater portion of the species from which tragacanth is obtained, are natives of Asia, having rigidly persistent petioles, forming spines. Most of the spinous species, furnish the peculiar exudation, which is known in commerce, as *Gum Tragacanth*, especially those inhabiting warm regions, but Botanists have not positively determined as to the particular plants. The *A. Verus*, a low and very hispid shrub, is stated by Olivier to afford the largest proportion of the gum sent to Europe. It is found growing naturally in Persia, Armenia and Asia Minor. The gum exudes from the stem naturally, or after incisions,

hardening as it exudes ; and is gathered from July till September. It is forwarded to India through Bagdad and Bassoro, then to Russia, and from thence to Aleppo. The other species which are admitted to furnish the gum, are *A. Gummifer*, a native of Syria and Koordistan, which is said to yield the white or best variety ; *A. Creticus*, growing in Crete, and *A. Aristatus*, a native of Greece and the south of Europe, and reputed to afford some of the tragacanth imported from Smyrna and Marseilles. Professor Lindley has likewise described another species, the *A. Strobiliferus*, growing in Koordistan, and furnishing the dark-colored, or inferior gum, which is mingled with the commercial article ; but this requires confirmation. The plants which yield tragacanth, resemble each other so closely, that much confusion has existed among Botanists in distinguishing them.

Tragacanth presents the appearance of very thin, pale-grayish, or grayish-yellow, almost parchment-like plates or scales, marked by spiral or circular ridges. It is semitransparent, or translucent, resembling horn in appearance, hard, more or less fragile, but difficult of pulverization, unless exposed to a freezing temperature, or thoroughly dried, and powdered in a heated mortar, tasteless and inodorous. Its powder is very fine and white. Sometimes pieces of a slightly reddish color are met with, of a roundish or irregularly oblong shape. The specific gravity of tragacanth is 1.384. Cold or boiling water converts it into mucilage ; introduced into cold water, it absorbs a portion of that fluid, swells very much, and forms a paste without being dissolved. By boiling, its solution is nearly completed. The mucilage is changed to a blue color by the addition of iodine, owing to the presence of a small proportion of starch. Tragacanth is insoluble in alcohol, and is composed of a substance soluble in water, and a substance not soluble, but which swells when placed in water. The soluble portion resembles gum arabic, but differs from it by not yielding any precipitate with silicate of potassa or sesquichloride of iron ; the insoluble portion is called *Tragacanthin*, constitutes 43 per cent. of the drugs, and is supposed to be identical with *bassorin*, with a small quantity of insoluble starch. The composition of tragacanth is not satisfactorily settled by chemists ; M. Guerin considers it to be a compound of 53.3 parts of arabin or soluble gum, 33.1 of bassorin and insoluble starch, 11.1 of water, and when burned 2.5 of ashes.

Properties and Uses.—Tragacanth is nutritive and demulcent ; seldom used except for the suspension of heavy, insoluble powders, to impart consistence to troches and lozenges, and to form paste for the druggists, with which to label their prescriptions.

ASSAFŒTIDA.

Assafœtida.

Nat. Ord.—Apiaceæ, or Umbelliferae. *Sex. Syst.*—Pentandria Digynia.

CONCRETE JUICE OF THE ROOT OF FERULA ASSAFŒTIDA.

Description.—*Ferula Assafœtida*, *Linnaeus*, or *Narthex Assafœtida*, *Falconer*, is described by *Kœmpfer*, who wrote from actual observation. It has a perennial, fleshy, tapering *root*, with a coarse hairy, or fibrous summit, about the size of a man's leg when full-grown, either simple like a parsnep, or with one or more forks; externally it is blackish, internally white, and abounding in a very fetid, opaque, milky juice. The *leaves* are radical, six or seven in number, nearly two feet long, shining, coriaceous, deep-green, pinnated, with pinnatifid segments whose lobes are oblong and obtuse; *petiole* terete, amplexicaul, channeled only at the base. The leaves grow vigorously through the winter, and wither at the termination of spring. From the midst of the leaves, rises a luxuriant, herbaceous *stem*, from six to ten feet high, two inches in diameter at the base, solid, simple, erect, round, smooth, striated, the spongy medulla traversed by bundles of tough, fibrous vessels, the surface clothed with the remains of persistent leafless petioles, and terminating in large plano-convex umbels with numerous radii. The *flowers* are pale-yellow; the *fruit* is flat, oval, thin, reddish-brown, slightly hairy or rough. The plant varies in its appearance, according to its situation and soil.

History.—This plant is a native of Persia. The gum-resin is prepared from incisions into the upper portion of the root, or by taking successive slices from it; plants under four years are not made use of, as they yield but little, if any, of the juice. At the time the leaves begin to fade, the root-leaves and stem are twisted off close to the root, and the soil is removed from its crown. About forty days afterward, a thin slice is cut off transversely from its summit, and a milky juice of a fetid, alliaceous odor gradually exudes. In about two days, or when this exudation has become hardened, it is scraped off, and another thin slice removed as before, from which juice again flows, and this process is repeated until no more juice can be obtained; while this collection is going on, the root is constantly protected from the solar rays. The concrete juice from several plants, are then put together, further hardened, and disposed of for home use or foreign exportation. The assafœtida in this country is either from India, or Great Britain, in mats, cases or casks, of from eighty pounds to several hundreds each.

This gum-resin as met with in the shops is in masses of different sizes, rather soft, varying in color, becoming reddish, and finally a dull yellowish-brown on exposure to the atmosphere; on being broken it presents

a shining, whitish surface, and changes color as it becomes exposed. The masses have an irregular, amygdaloid appearance, being composed of whitish tears agglutinated together. Sometimes the tears are to be had separate; they are oval, irregular, of the size of a pea or larger, brownish externally, white internally, and of weaker odor than that of the masses. The better the article is in the masses, the greater the quantity of tears, with but a small portion of the dark, soft, agglutinating material in which they are imbedded. Assafœtida has a fetid, tenacious and alliaceous odor, and a strong, peculiar, persistent, bitterish, and rather acrid taste. Age hardens it and renders it brittle, beside diminishing its taste and odor. It can only be pulverized at a low temperature, as in frosty weather; in warm weather it softens under the pestle. Moderate heat softens it so far that it may be squeezed through a coarse cloth, and freed from impurities of a mechanical nature; a stronger heat causes it to froth up, and at a red heat it burns with clear, lively flame. Its specific gravity is 1.327. Rubbed with cold or warm water, the gum is dissolved, forming a smooth white or pink-colored persistent emulsion, in which the resin and volatile oil are suspended. With rectified alcohol it forms a clear tincture, which is its best menstruum. Spirit dissolves the resin and oil, but is too feeble a solvent. Sulphuric ether dissolves the volatile oil and a portion of resin; solution of caustic potassa dissolves it almost entirely, forming an emulsion when the alkali is neutralized; and solution of ammonia dissolves the gum and oil, with part of the resin. It readily unites with other resins, gum-resins, and wax; and is best preserved in bladders kept in tin boxes.

Assafœtida contains volatile oil, resin soluble in ether, a tasteless resin insoluble in ether, gum, bassorin, sulphate of lime, carbonate of lime, oxide of iron and alumina, malate of lime, etc. The volatile oil may be procured by distillation with water or alcohol, at first it is pale-green, but becomes yellowish-brown by age, is lighter than water, of a powerfully offensive odor, and a taste peculiar to the gum-resin; it contains sulphur. This and the bitter resin are the active principles.

Properties and Uses.—Stimulant, antispasmodic, expectorant, emmenagogue, and feebly laxative. Improper in inflammatory conditions of the system. Used in hysteria, hypochondria, convulsions, spasmodic nervous diseases of females, spasm of the stomach and bowels, various irregular nervous disorders which accompany debility of the nervous system, and, in combination with morphia and quinia, in sick or nervous headache. With podophyllin and cunicifugin it is beneficial in chorea. Also useful in pertussis, asthma, infantile coughs and catarrhs, croup, measles, etc., whenever there is a want of nervous energy, or disposition to sink. Likewise efficient in amenorrhea and dysmenorrhea, and as an injection in tympanitic abdomen, lumbricus and ascarides. Dose, in

powder or pill, from five to ten grains; of the tincture, from half a drachm to two drachms.

Off. Prep.—Enema Assafoetidæ Composita; Tinctura Assafoetidæ; Tinctura Castorei Ammoniata.

ASTER PUNICEUS.

Red-stalked Aster.

Nat. Ord.—Asteraceæ, or Compositæ. *Sex. Syst.*—Syngenesia Superflua.

THE ROOT.

Description.—The root of this plant is perennial and fibrous; the stem is hispid, paniculate above, furrowed, generally red, or at least on the south side, stout and tall, growing from three to six feet in height. The leaves are oblong-lanceolate, amplexicaul, and more or less auriculate at base, sparingly serrate in the middle with appressed teeth, rough above, nearly smooth underneath, pointed; lower leaves with remote serratures, rough edged, and rough on the upper surface, all acuminate and narrowed at the base. Involucre loose, longer than the disk; the scales linear-lanceolate, long, revolute, nearly equal, and in two rows. Flowers large, showy, and of a pale purple or lilac-blue color. Rays from fifty to eighty, long and narrow.

History.—This plant is found growing in various parts of the United States, in swamps, ditches, along the borders of small streams, and sometimes in dry soils. It flowers from July to October. The radicles or fibers of the root, are the parts used, they are about the size of a pipestem, having a pungent, aromatic odor and taste, with some bitterness and astringency. Water or alcohol extracts their active properties. This plant is variously known by the names of *Cocash*, *Meadow Scabish*, *Squaw-weed*, etc.

Properties and Uses.—Stimulant and diaphoretic. The warm infusion may be used freely in colds, rheumatism, nervous debility, headache, pains in the stomach, dizziness, and menstrual irregularities. This, together with the *A. Cordifolius* are probably equivalents of valerian.

The Aster *Æstivus*, named *Rheumatic-weed*, also *Sampson Snakeroot*, *Star-flower*, etc., resembles the above plant, having lanceolate, sub-clasping leaves, tapering to the apex; margin rough; stem branching from its base, erect, hispid; branchlets pilose; involucre scaly; scales lax, linear, acute, equal. Flowers middle sized, and blue. It is found more abundantly west of the Alleghany mountains, and is recommended as an antispasmodic and alterative. Principally used in the cure of rheumatism in the form of infusion or tincture; recommended, however, in hysteria, chorea, epilepsy, spasms, irregular menstruation, etc., internally;

and used both externally and internally in many cutaneous diseases, the eruption occasioned by the poison rhus, and in the bites of venomous snakes. Dose of the infusion, one to four ounces; of a saturated tincture half a drachm to two drachms. This plant deserves further investigation.

ATROPA BELLADONNA.

Belladonna.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

LEAVES.

Description.—*Atropa Belladonna*, also known as *Deadly Nightshade*, *Dwale*, *Black Cherry*, etc., is a herbaceous, perennial plant, with a thick, branched, fleshy, creeping *root*, from which rise several erect, cylindrical, herbaceous, annual, hirsute, purplish *stems*, to the height of three or four feet. The *branches* are dichotomous, with ovate, entire, somewhat soft *leaves*, acuminate at both ends, of a dull-green color, mostly in pairs of unequal size, and on short petioles. The *flowers* are imperfectly axillary, solitary, stalked, and drooping. The *calyx* is green, persistent, and divided into five ovate segments. The *corolla* is monopetalous, campanulate, with the limb divided into five lobes, dark dull purple in the border, paler downward. *Stamens* five, shorter than the corolla, bearing cordate, four-lobed anthers. *Ovary* spheroidal, with a nectariferous gland beneath, and supporting a long, simple style, with a two-lobed stigma. The *fruit* is a round, two-celled berry, bearing some resemblance to a cherry, with a transverse furrow on each side, shining, smooth, at first green, then red, and finally of a deep purple color, and containing numerous reniform seeds, imbedded in a soft pulp, with a sweetish, violet-colored juice. When bruised, the whole plant exhales a fetid odor.

History.—This plant is a native of Europe, growing in shady places, flowering in June and July, and ripening its fruit in September; all parts of it are active. The leaves are the officinal part, and should be collected in June or July; when dry, they are of a brownish-green, or grayish-green color, scarcely any odor, and a faint, sweetish, slightly nauseous taste, and yield their properties readily to alcohol or water. The root is long, round, varying in thickness from one to several inches, fibrous, branched, reddish-brown externally, whitish internally, scarcely any odor, and a slightly sweetish taste. It should be collected early in the spring, or in the autumn, from plants at least three years old; water or alcohol is its menstruum. The extract is more commonly used than any other form. *Belladonna* contains atropia with excess of malic acid, pseudotoxin, phytocolla, chlorophylle, gum, starch, etc.

Properties and Uses.—An energetic narcotic poison. When taken in large doses it exerts an influence over the cerebro-spinal system, as manifested by dilation of the pupils, dimness or loss of vision, vertigo, partial deafness, confusion of ideas, constriction in the throat, difficulty of swallowing and articulating, thirst, nausea, and often the appearance of a red eruption; if the dose be excessive, all these symptoms will be greatly aggravated, with delirium, excessive laughter, violent gestures, and finally coma; when it causes death, convulsions often precede this result. Medicinally, it is anodyne, antispasmodic, and calmative, with some diaphoretic and diuretic properties. It is exceedingly valuable and useful in convulsions, spasms, epilepsy, puerperal convulsions, neuralgia, hooping-cough, chorea, mania, paralysis, amaurosis, rheumatism, gout, dysmenorrhea, obstinate intermittents, rigidity of os uteri, and all diseases in which the nervous system is involved. It is much in use as a prophylactic in scarlatina. Used externally, for dilating the pupil of the eye in various operations on that organ, to remove spasmodic stricture of urethra, neck of the bladder, and sphincter ani. Recommended, also, in strangulated hernia, asthma, and paraphimosis. The following has been recommended in neuralgia of the uterus: Mix together one grain and a half of alcoholic extract of belladonna, and three-fourths of a grain of opium. Place the two extracts in the center of a little pledget of carded cotton, and fold it up so as to inclose the extract; tie it up with a very strong thread, and leave a double thread eight inches long attached to it. The plug is to be introduced into the vagina by the physician or patient, and placed upon the neck of the uterus, where it is to be retained from twelve to twenty-four hours. In very painful menstruation accompanied by leucorrhea, from eight to fifteen grains of tannic acid, or geraniin may be added to the tampon. Dose of the powdered leaves, one to two grains, once or twice a day, and gradually increased till the peculiar effects of the medicine are produced; of the extract one-fourth of a grain to two grains.

The remedies in cases of poisoning by it, are the stomach-pump, emetics and purgatives, cold to the head, and in the comatose stage, ammonia internally, with external stimulants.

Off. Prep.—Atropia; Emplastrum Belladonnæ; Emplastrum Belladonnæ Compositum; Extractum Belladonnæ Alcoholicum; Tinctura Belladonnæ; Unguentum Belladonnæ.

ATROPIA.

THE ALKALINE PRINCIPLE OF A. BELLADONNA.

Preparation.—The following is the process employed by Mein. The roots of plants two or three years old were selected. Of these, reduced

to an extremely fine powder, 24 parts were digested, for several days, with 60 parts of alcohol of 86 or 90 per cent. The liquid having been separated by strong expression, the residue was treated anew with an equal quantity of alcohol; and the tinctures, poured together and filtered, were mixed with one part of hydrate of lime, and frequently shaken for twenty-four hours. The copious precipitate which now formed was separated by filtering; and diluted sulphuric acid was added drop by drop to the filtered liquor, till slightly in excess. The sulphate of lime having been separated by a new filtration, the alcoholic liquid was distilled to one-half, then mixed with six or eight parts of pure water, and evaporated with a gentle heat till the whole of the alcohol was driven off. The residual liquid was filtered, cautiously evaporated to one-third, and allowed to cool. A concentrated aqueous solution of carbonate of potassa was then gradually added, so long as the liquid continued to be rendered turbid; and the mixture was afterward suffered to rest some hours. A yellowish resinous substance which opposes the crystallization of the atropia was thus precipitated. From this the liquid was carefully decanted, and a small additional quantity of the solution of the carbonate was dropped into it, till it no longer became turbid. A gelatinous mass now gradually formed, which, at the end of twelve or twenty-four hours, was agitated in order to separate the mother-waters, then thrown upon a filter, and dried by folds of unsized paper. The substance thus obtained, which was atropia in an impure state, was dissolved in five times its weight of alcohol; and the solution, having been filtered, was mixed with six or eight times its bulk of water. The liquor soon became milky, or was rendered so by evaporating the excess of alcohol, and, in the course of twelve or twenty-four hours, deposited the atropia in the form of light yellow crystals, which were rendered entirely pure and colorless by washing with a few drops of water, drying on blotting paper, and again treating with alcohol as before. From twelve ounces of the root, Mein obtained by this process twenty grains of the pure alkali.—*Jour. de Pharm.* xx, 87.

History.—Thus prepared, atropia crystallizes in white silky prisms, is inodorous, and of a bitter taste; dissolves in ether or absolute alcohol, and slightly in water; it melts above 212° , and forms soluble salts with sulphuric, nitric, muriatic, and acetic acids. At an ordinary temperature, water dissolves about $\frac{1}{500}$ th, but aided by heat a much larger portion is taken up; the solution has a bitter, disagreeable taste. Dr. A. von Planta found atropia prepared by Merck to possess the following properties: It dissolved in 299 parts of water at the ordinary temperature; alcohol dissolved it in almost every proportion, ether less readily. Its solubility in all these fluids was increased by heat. At 194° F. it fused to a clear transparent mass, which became brittle on cooling; on the reapplication of heat, and again allowing it to cool, it was converted

into stellate groups of crystals. At 284° F. the greater portion is destroyed. Heated upon platinum foil, it melts, puffs up, gives off white fumes, and burns with a bright flame, leaving a shining black cinder, which finally disappears entirely. It has a strong alkaline reaction, and combines with acids forming uncrystallizable salts, soluble in water and alcohol, but sparingly so in ether. Its formula is $C_{34}H_{25}NO_6 = 289$.

Properties and Uses.—Same as Belladonna. Internally from one-twentieth to one-tenth of a grain may be given; and for external use it is preferred on account of its quicker action, more uniform strength, and greater cleanliness. One grain dissolved in four fluidrachms of distilled water by means of a few drops of acetic acid, will, on the application of one drop of this solution to the inner surface of the lower lid, cause dilatation of the pupil in fifteen or twenty minutes. In neuralgia, one grain may be mixed with a drachm of lard, and rubbed on the affected part. Dr. Lusanna has used it successfully in this affection by the endermic and iatroleptic method. The skin being previously removed by a blister, or, what is still better, because more speedy, the ammoniacal pomade of Goudret, when the atropia is dissolved in a small quantity of alcohol, then mixed with simple ointment and applied to the denuded surface. In this way, a half grain to a grain may be employed in the twenty-four or forty-eight hours. Iatroleptically, he uses the following ointment in the form of frictions over the part affected every two or three hours, consuming a portion the size of a pea each time: *R.* Atropia, 5 centigrammes, Alcohol at 36, q. s. Dissolve. Add axungia, 12 grammes.

* AVENÆ FARINA.

Oatmeal.

Nat. Ord.—Graminaceæ. *Sex. Syst.*—Triandria Digynia.

SEEDS OF AVENA SATIVA, GROUND.

Description.—Avena Sativa, or the common oat, is too well known to require a minute description; it has a smooth *stem*, from two to four feet high, with linear lanceolate, veined, rough *leaves*, with loose, striate sheaths; *stipules* lacerate; *panicle* equal, loose; *spikelets* pedunculate, pendulous, two-flowered, both flowers perfect, the lower one mostly awned; *paleæ* somewhat cartilaginous, closely embracing the caryopsis; *root* fibrous, annual.

History.—Oats were known to the ancient Greeks and are at present cultivated in all civilized countries, principally as food for horses. They have been naturalized in Sicily, and have been found in the island of

Juan Fernandez. Their native country is unknown. In the north of England, Scotland, and Ireland, in some parts of France, and other countries, oats form a large portion of the nutriment of the inhabitants. The meal, which is prepared by grinding the seeds, is made into a gruel, and is very nutritious and digestible, beside being somewhat laxative; it forms an excellent diet for the sick in many cases. The British colleges direct *groats*, which are the seeds deprived of their husks; and these, when ground into fine meal or flour, are *prepared groats*.

Oats contain, according to the analysis of Vogel, 66 per cent. of meal, and 34 per cent. of husk; the dried meal consists of starch 59, saccharo-mucilaginous extract 10.75, albumen 4.3, oleaginous matter 2, ligneous fiber and moisture 24. Other analyses have been made, which vary from the above in quantity and elements, showing oats to consist of a large proportion of starch, some sugar, gum, oil, albumen, gluten, a nitrogenous body, epidermis, alkaline salts, etc.

Oatmeal is inodorous, slightly bitter, insoluble in alcohol, ether, and the oils; but alcohol and ether remove an oleo-resinous matter from it; it yields its nutritive properties freely to boiling water.

Properties and Uses.—Nutritive and demulcent. Good in habitual constipation, but not in dyspepsia, accompanied with acidity of stomach. In the form of gruel, either salted or seasoned with sugar, honey, or the pulp of fruit, it is an agreeable nutritive during convalescence from acute diseases, in the puerperal woman, and in some chronic diseases. Oatmeal made into a cake with water, baked and browned like coffee, then pulverized and made into a coffee, or infusion, forms a drink which will allay nausea and check vomiting, in a majority of cases, when all other means fail, and used thus is very useful in diarrhea, dysentery, cholera-morbus, and irritable conditions of the stomach. Oatmeal gruel may be prepared by boiling an ounce of the meal with three pints of water to a quart, straining the decoction, allowing it to stand till it cools, and then pouring off the clear liquor from the sediment. Sugar, raisins, or lemon-juice are frequently added to improve its flavor.

BALSAMODENDRON MYRRHA.

Myrrh.

Nat. Ord.—Amyridaceæ, or Burseraceæ. *Sex. Syst.*—Octandria Monogynia.

CONCRETE JUICE OR GUMMY RESINOUS EXUDATION.

Description.—The Balsamodendron Myrrha, is a small shrubby tree, covered with a pale gray or whitish gray bark, and with squarrose and spinose branches. The *leaves* are ternate, on short petioles, and consist

of obovate, obtuse, smooth leaflets, somewhat denticulate at the apex. The *flowers* are unknown. The fruit is oval, lanceolate, pointed, smooth, longitudinally furrowed, of a brown color, a little larger than a pea, supported on a very short peduncle, and surrounded at its base by the persistent calyx.

History.—The myrrh tree grows in Arabia, and in the neighborhood of Abyssinia and the Red sea. The juice exudes spontaneously and concretes upon the bark, which when collected is the medicinal gum myrrh. The best kind of myrrh is in irregular pieces, somewhat resembling tears, often tuberculated, varying in size from a pea to a large walnut, or even larger, of a bright reddish-brown color becoming clearer red when breathed upon. Myrrh is brittle and pulverizable, and has a peculiar, agreeable, balsamic odor, and a bitter, aromatic, not unpleasant taste. When heated it softens, then froths up, and at length inflames and burns with difficulty. Its active constituents are oil and resin, and its proper solvent is rectified spirit. It is only partially soluble in water, proof spirit, and ether; water dissolves its arabin, and the mucilage retains the oil and part of the resin in the state of emulsion; proof spirit dissolves some of the resin. Water added to its alcoholic tincture renders it opake, but without any precipitation. Alkaline solutions dissolve the gum resin. Myrrh consists of volatile oil 2.6, bitter resin 23, soluble gum 46, insoluble gum 12. Ruickholdt has obtained in 100 parts, volatile oil 2.183, resin 44.760, arabin 40.818, water 1.475, and various salts, etc., 3.650. He calls the resin *myrrhin*; it is neutral, but by being kept in a state of fusion for a short time acquires acid properties, which state he proposes to term *Myrrhic Acid*.

Myrrh added to nitric acid, produces a transparent, dirty-yellowish liquid; false myrrh produces a bright yellow liquid, and bdellium is not dissolved by it, but becomes whitish and opake. M. Righini states that if myrrh in powder, be rubbed for ten or fifteen minutes with an equal weight of muriate of ammonia, and fifteen times its weight of water gradually added, it may be considered pure, if it dissolves quickly and wholly.

Properties and Uses.—Stimulant tonic, antiseptic, expectorant, emmenagogue, and by some considered anthelmintic. Used in debilitated states of the system, in chronic catarrh, phthisis, humoral asthma, other pectoral affections in which mucus secretion though abundant is not easily expectorated, chlorosis, amenorrhea, etc. Also reputed useful in chronic gonorrhea, gleet, and other excessive chronic mucous discharges. As a local application it is useful in spongy gums, aphthous sore mouth of children, indolent and gangrenous ulcers. It is sometimes combined with hydrastis and capsicum, in aphthæ, and with tincture of castor as an emmenagogue. Dose of the powder, ten to thirty grains; of the tincture, one to two drachms.

Off. Prep.—Mistura Chenopodii Composita ; Pulvis Nigrum ; Pilulæ Copaiabæ Compositæ ; Tinctura Myrrhæ ; Tinctura Myrrhæ Composita ; Tinctura Aloës et Myrrhæ ; Lotio Myrrhæ Compositæ.

BAPTISIA TINCTORIA.

Wild Indigo.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Decandria Monogynia.

BARK OF THE ROOT AND LEAVES.

Description.—Baptisia Tinctoria, also known as *Horse-fly weed*, *Rattle-bush*, etc., has a large and woody perennial root, very irregular, blackish externally, and yellowish within, with numerous, lighter-colored radicles. The stem is round, yellowish-green, smooth, marked with black dots, much branched, and growing from two to three feet high ; the branches are slender, and of a yellowish color. The leaves are small, alternate, and formed of three sessile, obovate, smooth, bluish-green leaflets, with minute, evanescent stipules. Racemes loose, terminal, few-flowered. Flowers yellow, in small loose spikes at the ends of the branches, six, twelve or more in each raceme. Calyx campanulate, bilabiate, upper lip entire or emarginate, lower trifid. Stamina included, deciduous. Ovary stipitate, bearing a minute stigma. Legume bluish-black, about as large as a pea, on a long stipe, inflated, oblong, with a row of small subreniform seeds.

History.—This is a small shrub, found in most parts of the United States in dry situations, though occasionally it is to be met with in low, marshy ground. It flowers in July and August, having bright yellow flowers, in small loose clusters at the end of the branches. The fruit is an oblong pod, of a bluish-black color. It contains indigo, tannin, an acid, and baptisin. When the whole plant, or any portion of it is dried, it becomes black, and affords a blue dye, inferior to indigo. In some parts of the country the young shoots are used as a substitute for asparagus, to which they bear some resemblance, and they occasionally cause drastic purgation, especially if used after they assume a green color. Alcohol, or water will take up its active properties. Both the root and leaves are medicinal, and deserve further investigation. The root is inodorous, and of a nauseous, somewhat acrid taste ; its virtues appear to reside chiefly in the bark.

Properties and Uses.—Purgative, emetic, stimulant, astringent and antiseptic. Principally used on account of its antiseptic virtues. A decoction of the bark of the root is an excellent application as a wash or gargle to all species of ulcers, as malignant ulcerous sore mouth and

throat, mercurial sore mouth, scrofulous, or syphilitic ophthalmia, erysipelatous ulcers, gangrenous ulcers, sore nipples, etc. ; or it may be made into an ointment for external application. As a poultice or fomentation it is highly useful in all ulcers, tumors, or inflammations tending to gangrene. In fetid leucorrhœa, fetid discharges from the ears, etc., the decoction will be found efficient, if injected into the parts with a suitable syringe. The leaves applied in fomentations, have discussed tumors and swelling of the female breast, resembling scirrhus.

Internally, it may be used in the form of decoction or syrup, in scarlatina, typhus, and all cases where there is a tendency to putrescency. It acts powerfully on the glandular and nervous systems, increasing all the glandular secretions, and arousing the liver especially to a normal action ; and is very efficient in the atonic varieties of acute rheumatism and pneumonia.

I make much use of the dried alcoholic extract of the root-bark in the low stage of typhoid, and typhoid conditions generally in conjunction with leptandrin ; and have used it extensively for the last ten years, and with very excellent effect in all diseases of a tuberculous character. I take pleasure in introducing to the profession, the active principle of this plant. *Baptisin*, prepared similarly to Aletrin, or it may be precipitated by an acid, or by acetate of lead from the saturated tincture : I have found it to exert a powerful influence on the glandular system in doses of from one-fourth to one half a grain ; if given in large doses it produces a very disagreeable prostration of the whole system. It is also an excellent application to gangrenous and erysipelatous ulcerations, malignant and fetid ulcerations of the cervix uteri. Combined with leptandrin, podophyllin, quinia, or cimicifugin, in diseases where these agents are indicated, it will be found valuable in typhus and typhoid fevers, and all diseases of a typhoid character, when administered internally.

Baptisin is of a yellowish-brown color, a strong odor, similar to that of the powdered root, and of a rather bitter, not very disagreeable taste, persistent in its character. It is insoluble in water, ether, the mineral acids, acetic acid, also in volatile oils, oil of turpentine, and chloroform, floating on the surface of this last. Ammonia added to it in water, causes it to be nearly completely dissolved, and gives a dense, light bluish-yellow solution. Liquor potassa, likewise causes it to imperfectly dissolve in water, giving a dark-yellow precipitate, and a light yellow saponaceous solution. It is partially soluble in alcohol, and on the addition of ammonia becomes entirely dissolved, but gives a precipitate on standing. Sulphuric acid turns it a dark yellowish-red color ; nitric acid yellowish-green ; and muriatic acid affects no change in its color.

Dose, of the decoction, made by boiling one ounce of the powdered bark in two pints of water, down to one pint—one tablespoonful every

1, 2, or 4 hours as required—if it purge, produce nausea, or a disagreeable relaxation of the nervous system, lessen the dose, or omit its use entirely, for a time; of the hydro-alcoholic extract, 1 to 4 grains every 2, 3, or 4 hours.

The *Baptisia Alba*, or Prairie Indigo of the western prairies, with the flowers white, may be substituted for the above.

Off. Prep.—Extractum Baptisiæ Hydro-Alcoholicum; Pilulæ Baptisiæ Compositæ; Unguentum Baptisiæ.

BAROSMA CRENATA. (*Diosma Crenata*.)

Buchu.

Nat. Ord.—Rutaceæ. *Ser. Syst.*—Pentandria Monogynia.

THE LEAVES.

Description.—This plant formerly belonged to the genus *Diosma*, but has been transferred by Botanists to that of *Barosma*. It is a slender, smooth, upright, perennial shrub, between two and three feet in height, with twiggy, somewhat angular branches, of a brownish-purple color. The leaves are opposite, spreading, about an inch long, ovate, acute, on very short petioles, very obtuse, delicately and minutely crenated, quite glabrous, rigid, darkish-green and quite smooth above, with a very few obscure, oblique nerves, beneath paler, dotted with glands which are scarcely pellucid, while at every crenature is a conspicuous pellucid gland. The flowers are whitish, or of a pale-reddish color, solitary, on short pedicels at the ends of short lateral shoots. The calyx has five ovate-acuminate, persistent sepals, green, tinged with purple, beneath which are two or three pairs of small imbricated bracteas. The corolla has five elliptic, oblong, bluntish petals, somewhat spreading, which are purple when in bud, and blush-colored when fully expanded. The stamens are five, subulate, and bearing ovate, incumbent anthers; filaments slightly villous. The ovary is superior, turbinate, supporting an erect style crowned with a minute, five-lobed stigma. The capsule is ovate, containing a single, oblong, black, shining seed, with an elastic testa.

History.—This plant is a native of southern Africa, the official part of which is the leaf. There are several varieties from which the leaves are obtained, as the *Barosma Crenata*, *B. Crenulata*, *B. Serratifolia*, etc. The leaves are odoriferous, and when powdered are termed by the Hottentots, Booko or Buchu, and are used by them to rub upon their greasy bodies. They likewise prepare a Buchu Brandy by distilling the leaves with wine, and which they employ as an efficient remedy in all affections of the stomach, bowels, and bladder; they also apply a decoction of the leaves to wounds.

As found in our markets, the leaves are from three-quarters of an inch to an inch in length, from three to five lines broad, elliptical, lanceolate-ovate, or obovate, sometimes slightly pointed, sometimes blunt at the apex, very finely notched and glandular at the edges, smooth, green on their upper surface, dotted and paler beneath, and of a firm consistence. They have a strong, diffusive, aromatic odor, with very faint bitterness; the taste and odor being somewhat allied to pennyroyal, and which will serve to distinguish them from senna leaves. If they be preserved with ordinary care, their odor will remain for some years. The leaves of the *B. Serratifolia* may be known by their linear-lanceolate form, and serrulate edges; and those of the *B. Crenulata* much resemble those of the *B. Crenata*, but are oblong-ovate, and have a narrow pellucid margin around the whole leaf. They all possess similar properties. Analysis has detected in them, a light, yellowish-brown, and highly odorous volatile oil, gum, extractive, which is precipitated by infusion of galls, chlorophylle and resin. Water or alcohol extracts their virtues, which are chiefly dependent on the volatile oil and extractive.

Properties and Uses.—Buchu is a stimulant, diuretic, antispasmodic, and tonic. Useful in all diseases of the urinary organs attended with increased uric acid; in irritation of the bladder and urethra attending gravel, in catarrh of the urinary bladder, and incontinence connected with diseased prostate. It has also been recommended in dyspepsia, dropsy, cutaneous affections, and chronic rheumatism. I do not, however, think it equal to many of our indigenous remedies, which are sadly neglected by the profession, in their eagerness for something at a distance from home. Were our native plants more closely investigated, there would be but little use for foreign, and consequently expensive agents. Under favorable circumstances a warm infusion of Buchu leaves, will cause diaphoresis. Dose of the powder, from twenty to thirty grains, two or three times a day; of the infusion, two to four ounces, three or four times a day; of the tincture, one to two fluidrachms.

Off. Prep.—Extractum Barosmæ vel Buchu Fluidum; Infusum Barosmæ.

BENZOIN ODORIFERUM.

Spicewood.

Nat. Ord.—Lauraceæ. *Sex. Syst.*—Enneandria Monogynia.

THE BARK AND BERRIES.

Description.—Benzoin Odoriferum, or the *Laurus Benzoin* of Linnæus, is sometimes known as *Spicebush*, *Feverbush*, *Wild Allspice*, *Benjamin-*

Bush, etc. ; it is a shrub growing from five to twelve feet in height, with obovate-lanceolate, veinless, entire, deciduous *leaves*, green on each side, and slightly pubescent beneath; *flowers* yellow, in little naked umbels on the naked branches, often dioecious; *buds* and *pedicels* smooth; *fruit* the size of an olive, bright-red, in clusters, containing an ovate, pointed nut. *Calyx* six-cleft, with oblong segments.

History.—This shrub grows in moist, shady places, in all parts of the United States; it bears greenish-yellow flowers in April, which are succeeded by small clusters of oval berries, and which in the latter part of September, when ripe, are of a shining crimson color. The whole plant has a spicry, agreeable flavor, which is strongest in the bark and berries, and which is communicated to boiling water, or proof spirit.

Properties and Uses.—Aromatic, tonic, and stimulant. An infusion or decoction has been successfully used in the treatment of intermittents, and low forms of fever, also as an anthelmintic. The berries afford a stimulant oil, much esteemed as an application to bruises, chronic rheumatism, itch, etc., and has some reputation as a carminative in flatulence, flatulent colic, etc. The bark, in decoction, is said to be refrigerant and exhilarating, and exceedingly useful in all kinds of fever, for allaying excessive heat and uneasiness; a warm decoction is employed to produce diaphoresis. The decoction may be drank freely.

BENZOINUM.

Benzoin.

Nat. Ord.—Styracaceæ. *Sex. Syst.*—Decandria Monogynia.

THE CONCRETE JUICE OF STYRAX BENZOIN.

Description.—*Styrax Benzoin* is a tall tree of quick growth, with many strong, round branches, covered with a hoary and fine whitish downy bark. Its *leaves* are alternate, on short petioles, ovate-acuminate, entire, smooth above, and tomentose beneath. The *petioles* are round, striated, channeled, tomentose. The *flowers* are in compound axillary racemes, nearly the length of the leaves, usually hang all on the same side, with angular downy *peduncles*, and a few, tomentose, oblong, deciduous *bracts*. The *calyx* is campanulate, downy, and minutely five-toothed; the *corolla* is longer than the calyx and is five-cleft, the segments are linear, and obtuse, somewhat silky rather than tomentose. *Stamens* ten; *filaments* connected below into a tube almost as long as the calyx, and bearing linear, erect anthers. The *ovary* is superior, ovate-tomentose, with a filiform style and simple stigma. The *fruit* is a drupe of a globose form containing one or two angular nuts, convex on one side, and concave on the other.

History.—This tree is a native of Sumatra, Borneo, Java, Siam, etc., where it is cultivated; it is called *Benzoin Tree* or *Benjamin Tree*, and furnishes the benzoin of commerce. This resinous balsam is obtained by making incisions into the bark of trees six or seven years old, from which the balsam exudes in the form of a thick, white, resinous juice, which is allowed to remain for three months before it is collected, when new incisions are made. There are several varieties of benzoin, the best of which are in tears of a whitish color, and united by a reddish-brown connecting medium; the brown or blackish masses, which are more common, usually contain many impurities, and are inferior to the tears.

Benzoin is firm, brittle, pulverizable, of an agreeable balsamic odor when rubbed, and of a sweetish, balsamic, somewhat acrid taste. When pure, it is wholly soluble in alcohol or ether. When heated, thick, white, pungent fumes of benzoic acid are given out, which cause coughing when inhaled. In pulverizing it, sneezing is apt to be induced. Water added to its alcoholic solution, precipitates it, rendering the liquor milky, and which has been heretofore much used as a cosmetic, under the name of *Virgin's Milk*. Its specific gravity is from 1.06 to 1.09. It contains volatile oil, resin, a balsamic matter, aromatic extractive, with a large proportion of benzoic acid.

Properties and Uses.—Stimulant and expectorant, and has some influence on the sexual organs. It enters into the manufacture of elixir paregoric, and constitutes the basis of Turlington's and many other balsams, which exert a salutary influence in healing wounds; the tincture is also employed to form a coating over the adhesive preparation so well known as *Court Plaster*. The fumes or vapor inhaled into the lungs, has been strongly recommended in chronic laryngitis. But principally used to prepare benzoic acid, to improve the taste and odor of other medicines, and in perfumery.

A preparation has been recently used with some degree of success in hemorrhages, called *Pagliari's Hemostatic or Styptic*. It is made by boiling together for six hours in a glazed earthen vessel, Alum one pound, Tincture of Benzoin eight ounces, Water ten pounds. As the water evaporates it must be constantly replaced by hot water, so as not to interrupt the ebullition, and stir the resinous mass round constantly. Then filter the fluid and keep in stoppered bottles. It is limpid, color of champagne, styptic in taste, and aromatic in odor. White resin has been successfully substituted for the benzoin. Every drop of this fluid poured into a glass containing human blood produces an instantaneous magma; and by increasing the proportion of the styptic to the quantity of the blood, a dense, homogeneous, blackish mass results. It is said to be useful in all arterial and venous hemorrhages. In applying it, lint and bandages should be used to prevent the coagula which forms from being

removed from the mouths of the vessels; an application of them for twenty-four or forty-eight hours is sufficient.

Off. Prep.—Acidum Benzoicum; Tinctura Benzoini Composita; Unguentum Benzoini.

BERBERIS VULGARIS.

Barberry.

Nat. Ord.—Berberidaceæ. *Sex. Syst.*—Hexandria Monogynia.

BARK AND BERRIES.

Description.—*Berberis Vulgaris* is an erect, deciduous shrub, from three to eight feet high, with long, bending branches which are dotted with triple spines. The *leaves* are obovate-oval, simple, closely serrulate, crowded, forming fan-like groups, alternate, from one and a half to two inches long, and about one-third as wide, tapering at their base into the petioles, with small thorns at their base, which are a transformation of the primary leaves. The *flowers* are many, on slender and pendulous racemes, yellow, small, and succeeded by loose branches of bright-red berries, of an oblong form, of a pleasant acidulous taste.

History.—This shrub is found from Canada to Virginia, on hills, mountains, and among rocks; it is rare in the west and in rich soils. It flowers in April and May, and ripens its fruit in June. *Berberine* is its active alkaline principle.

Properties and Uses.—Tonic and laxative. Used extensively by practitioners in the New England States, in all cases where tonics are indicated, also in jaundice, and chronic diarrhea and dysentery. The berries form an agreeable acidulous draught, useful as a refrigerant in fevers, also beneficial in dysentery, cholera-infantum, diarrhea, etc. The bark is bitter and astringent, and has been used with advantage as a tonic, and has proved efficacious in the treatment of jaundice. The bark of the root is the most active; a teaspoonful of the powder will act as a purgative. A decoction of the bark or berries, has been found of service as a wash or gargle in aphthous sore-mouth, and in chronic ophthalmia.

BERBERINA.

THE ALKALINE PRINCIPLE OF BARBERRY.

Preparation.—An alcoholic extract of the *Berberis Vulgaris* is prepared, to which water is added. This throws down a pulverulent brown substance; the fluid is then poured off, and the substance dried; it is

then treated with alcohol, which takes up the Berberine, leaving a small portion undissolved. By evaporating the alcohol the berberine remains. It resembles an extract, and is of a brownish-yellow color, translucent, with the smell of the root, and a pure, bitter taste; it becomes soft in the air. It is soluble in alcohol. Berberine may be obtained in crystals.

Properties and Uses.—Tonic and laxative, operating similar to a combination of rhei and hydrastis. Used in the same cases as the root. Dose, two to ten or even twenty grains. This article is not sufficiently used by Eclectics.

BETULA LENTA.

Black Birch.

Nat. Ord.—Betulaceæ. *Sex. Syst.*—Monœcia Polyandria.

BARK.

Description.—Betula Lenta, also known as *Cherry Birch*, *Sweet Birch*, *Mahogany Birch*, etc., is a large tree growing from fifty to seventy feet in height, with a diameter of from two to three feet. The leaves are cordate-ovate, acuminate, acutely and finely doubly serrate, hairy on the veins beneath, and on the petioles. *Fertile aments* erect, elliptical, thick, somewhat hairy; *sterile aments* two to three inches long, longer than the fertile, and not so thick; *lobes of the veiny scales* nearly equal, obtuse, diverging.

History.—This is a well known tree, growing in various parts of the United States. The trunk is invested with a dark-brown or reddish bark, which becomes rough in old trees, and has, together with the leaves, an aromatic flavor and taste, somewhat similar to Gaultheria Procumbens. The wood is of a reddish color, strong, compact, and takes a fine polish; it is much used in cabinet work. The cambium is used in the spring by boys, as a delicious morsel. The bark is the part used, and yields its properties to water.

Properties and Uses.—Gently stimulant, diaphoretic, and astringent. Used in warm infusion wherever a stimulating diaphoretic is required, also in diarrhea, dysentery, cholera-infantum, etc. In decoction or syrup, it forms an excellent tonic to restore the tone of the bowels, after an attack of dysentery. Said to have been useful in gravel, and female obstructions.

BIDENS BIPINNATA.

Spanish Needles.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Frustranea.

ROOT AND SEEDS.

Description.—*Bidens Bipinnata* is an annual plant, with a smooth, branched *stem* growing from one to four feet high; the *leaves* are bipinnately parted, nearly smooth, petioled; the *leaflets* are ovate-lanceolate, pinnatifid, mostly wedge-shaped at the base; *heads of flowers* on slender peduncles, each with three or four obscure, obovate, yellow rays; *outer involucre* of linear scales as long as the inner, and nearly as long as the short, pale, yellow rays; *achenia* long and slender, four-grooved and angled, nearly smooth, three or four awned, which adhere to the dress and to the fleece of animals.

History.—This is a common plant, growing in waste places on dry soils, flowering from July to September, and found from Connecticut to Pennsylvania, and westward.

The *Bidens Frondosa*, common Beggar-Tick, has a smooth, branching, rather hairy *stem*, from two to six feet high; the *leaves* are three to five, divided; *leaflets* lanceolate, pointed, coarsely toothed, mostly stalked; *outer leafy involucre* much longer than the head, ciliate below; *rays* none; *flowers* in clusters at the end of the branches, yellow; *achenia* wedge-obovate, two-awned, the margins ciliate with upward bristles, except near the summit. This is a common, very troublesome weed, growing in moist, cultivated fields throughout the United States; the achenia, as in the other species, adhering by their retrorsely-barbed awns to clothes, etc. It flowers from July to September.

The *Bidens Connata* (*Bidens tripartita*,) Cuckold, or Swamp Beggar's Tick, has a smooth *stem*, four-furrowed, with opposite branches, and grows from one to three feet high. The *leaves* are lanceolate, opposite, serrate, acuminate, slightly connate at the base, the lower ones mostly trifid; the lateral divisions united at the base, and decurrent on the petiole; *scales of the outer involucre* longer than the head, leafy, mostly obtuse, scarcely ciliate; *rays* none; *achenia* narrowly wedge-form, two, three, or four-awned, and with downwardly-barbed margins. Flowers terminal, solitary, consisting only of the tubular, yellow florets, surrounded by a leafy involucre. This is likewise a common weed found in wet grounds, rich fields, swamps and ditches, from New England to Missouri. It flowers in August. The root and seeds of all these plants are employed medicinally, and may be used in decoction, infusion, or tincture.

Properties and Uses.—Emmenagogue and expectorant; the seeds in powder or tincture have been successfully used in amenorrhea, dysmenorrhea, and some other uterine derangements; and an infusion of the root has proved beneficial in severe cough. The *Bidens Connata* has likewise been recommended in the above affections, also in palpitation of the heart, in which the infusion or decoction, drank freely through the day, has been found effectual. The *Bidens Frondosa* in infusion has cured several severe cases of croup, even where they have been considered beyond aid. A strong infusion of the plant, sweetened with honey, was administered to the children, warm, in doses of a tablespoonful or more every ten or fifteen minutes, until it vomited. A quantity of mucous and membranous shreds were ejected, followed by immediate relief; the children passed into a sleep, from which they awakened perfectly well. In a few hours after the emetic operation of the warm infusion, it acted as a cathartic. The leaves from which the infusion was made, were, at the same time, placed in a piece of flannel with some brandy added to them, and laid over the chest and throat. This plan is also beneficial in colds, acute bronchial and laryngeal attacks from exposures to cold, etc.

BRAYERA ANTHELMINTICA.

Kousso. Cossou.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—

THE FLOWERS.

Description.—This is a tree growing about twenty feet high, with round, rusty, tomentose-villose branches, marked by the annular cicatrices of the fallen leaves. The leaves are crowded, alternate, interruptedly imparipinnate, and sheathing at the base; leaflets oblong, or elliptical-lanceolate, acute, serrate, villose at the margin and on the nerves of the under surface. Stipules adnate to the petiole, which is dilated at the base, and amplexicaul. Flowers dicecious, small, greenish, and becoming purple; repeatedly dichotomous; the pedicles with an ovate bract at the base. The so-called male flowers may be regarded as hermaphrodite flowers, inasmuch as the carpels are well developed. The female flowers are somewhat different in their structure. The outer segments of the calyx are much more developed than in the female flowers, and are four or five times larger than those of the inner row, and are placed somewhat below them; the petals are entirely wanting; the stamina are rudimentary and sterile. The ripe fruits are unknown.

History.—This plant was introduced into notice by a pharmacien of Paris, and its properties as an anthelmintic were investigated by the

Academy of Medicine, as early as 1847; who, with the Academy of Sciences, made a favorable report. It grows in Abyssinia, the flowers being the parts of the plant used; they are reduced to a fine powder, which is brownish, like jalap, bitter, somewhat nauseous, and an odor similar to scammony. The plant is named in honor to Dr. Brayer, who first made its virtues known in Europe. Bruce, in his travels, vol. vii, appendix, gives a minute description of the plant, and calls it, in testimony of esteem for a friend, "*Banksia Abyssinica*." Dr. Kirk, in the appendix to the second volume of the "*Highlands of Ethiopia*," by Sir W. C. Harris, calls it "*Hagenia Abyssinica*," and states "that a cold infusion of the dried flowers and capsules, constitutes the famous *drasticum purgans* and *anthelminticum* of the Abyssinians."

Properties and Uses.—Purgative and anthelmintic. Used by the Abyssinians for tapeworm, to which they are very subject, and it is said they will not travel without having some of the Kousso with them. The dose of the flowers in powder is a small handful, or about four drachms and a half, which is to be macerated in about three gills of lukewarm water for fifteen minutes. The infusion, with the powder suspended in it, is taken either in one, two or three doses, quickly following each other. It is recommended that lemon-juice, or tamarind water, should be taken freely before and after the Kousso. The patient must be prepared by low diet for one or two days previously, and by a dose of castor oil, or other purgative, and the Kousso is to be taken on an empty stomach before breakfast. The clear infusion has the color, and a somewhat similar taste, to very weak senna tea. Its operation is safe, speedy, and most effectual, rarely causing any annoyance or uneasiness, except a slight nausea, and this but seldom; occasionally emesis takes place, or diuresis. A gentle cathartic after its operation is also advisable. As far as it has been used, it has not failed to kill and expel the worm.

BUXUS SEMPERVIRENS.

Box.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Monœcia Tetrandria.

THE LEAVES.

Description.—*Buxus Sempervirens* is a small, dense-leaved, hard-wooded, evergreen tree. The *leaves* are ovate, opposite, deep shining green, becoming red in the autumn, quite smooth and entire, with the cuticle of the underside readily stripping off; *petioles* and *young branches* slightly downy; *flowers* aggregate, axillary, pale-yellow. *Capsule* globular, three-horned, triccous, six-seeded, bursting elastically. *Seeds* parallel, oblong, slightly compressed, externally rounded.

History.—This is an exotic though generally well-known plant, growing on dry chalky hills in Europe, and the west of Asia. One variety of it, the *B. Suffruticosa*, Dwarf-box, with obovate leaves, and a stem scarcely woody, and which is much esteemed for borders along the walks of gardens, possesses similar medical virtues. It is of very slow growth, a tree eight feet high must be one hundred years old. The wood is yellow, very hard, and much used by wood-engravers for woodcuts, also for other purposes. The leaves, which are the parts used, are bitter and nauseous, and impart their properties to water or alcohol.

Properties and Uses.—Cathartic, sudorific, alterative, and anthelmintic. It may be used in syrup or extract, in all diseases where an alterative is required; said to be an equivalent of *Stillingia* in syphilis, but I have used the plant somewhat extensively, and do not consider it near as effectual. In doses of ten or twenty grains of the powdered leaves, it proves an excellent vermifuge. The dose of a strong decoction or syrup, is from half an ounce to an ounce, three or four times a day. And in combination with the *Stillingia* and *Corydalis*, in the form of syrup, it forms one of the best antisyphilitic remedies known in practice. Reputed to possess antispasmodic virtues, and to have been beneficially used in epilepsy, chorea, hysteria, etc., but requires further corroboration. Chips of the wood are said to have the same properties, and have been prescribed in syphilitic diseases, and chronic rheumatism. A fetid empyreumatic oil, *oleum buxi* was formerly prepared, but the use of which has become superseded by the preparations of *Guaiacum*; it has, however, been successfully used in toothache. Camels who eat the leaves are said to become poisoned.

CALENDULA OFFICINALIS.

Garden Marygold.

Nat. Ord.—Asteraceæ. *Ser. Syst.*—Syngenesia Necessaria.

THE LEAVES AND FLOWERS.

Description.—*Calendula Officinalis* has a fibrous, annual root, with a stem about a foot high, having many patent dichotomous, or sometimes trichotomous branches, striated, green, succulent, hispido-pubescent. The leaves are alternate, oblong, acute, mucronate, sessile, somewhat succulent, broad, and a little cordate at the base, the margins quite entire, and often scabrous-ciliate. Flower-heads large, terminal, solitary upon each branch, of a rich, full golden yellow, deeper and brighter previous to their full expansion. *Involucre* of many nearly equal, appressed, linear-subulate, pilose-hispid leaves or scales, not one-third so long as the

radiant florets, the apices a little recurved. *Achenia* carinate, muricate, incurved. *Corollas of the ray* ligulate, female tridentate, broadly linear, the lower tubular portion hairy. *Ovary* singularly boat-shaped, curved like a horse-shoe, large, green, downy within, having a thickened margin, more or less tuberculated on the back. *Florets of the center* all tubular, small, male, and consequently sterile; the mouth five-cleft, base hairy. *Abortive ovaries* cylindrical, downy, green. *Receptacle* dotted.

History.—This is a well-known garden plant, with a feeble, aromatic, not very unpleasant smell, and a bitter, rough, saline taste. The leaves and flowers are generally used, and impart their active properties to alcohol, or boiling water.

Properties and Uses.—Slightly stimulant and diaphoretic. Used for similar purposes with saffron, but less active. Has been reputed antispasmodic, deobstruent, and emmenagogue, and recommended in low forms of fever, scrofula, jaundice, amenorrhea, cancer, etc. Used in infusion, or in the form of extract, from four to six grains, three or four times a day; also applied locally to cancerous and other ulcers. Probably over-estimated. Dr. Wm. J. Clary of Monroeville, Ohio, writes me as follows, in relation to this plant: "As a local remedy, after surgical operations, it has no equal in the *Materia Medica*. Its *forte* is its influence on lacerated wounds, without regard to the general health of the patient, or the weather. If applied constantly, gangrene will not follow, and I might say there will be but little, if any danger of tetanus. When applied to a wound, it is seldom that any suppuration follows, the wound healing by replacement or first intention. It has been tested by several practitioners, and by one, is used after every surgical operation with the happiest effect. You need not fear to use it in wounds, and I would not be without it, for a hundred times its cost. It is to be made into a saturated tincture with whisky diluted with one-third its quantity of water; lint is saturated with this, applied to the parts, and renewed as often as it becomes dry."

CALX.

Lime.

Preparation.—Lime does not exist in the pure or caustic state in nature, but is obtained from some form of the native carbonate, which is calcined by an exposure to strong heat; the carbonic acid is thus driven off, and the lime remains. It is usually procured from common limestone, which, however, contains several impurities. A purer lime may be obtained from chalk; and when intended for nice chemical operations white marble or oyster-shells should be used. These may be reduced to small fragments, placed in a covered crucible, and exposed to a full

red heat for three hours; after the lime has become cool, it should be at once secured in well-closed vessels, to prevent it from absorbing carbonic acid from the atmosphere, which it does very speedily.

History.—Lime is a grayish-white, brittle, earthy-like substance, of a strong, alkaline, caustic taste, infusible, except under the compound blow-pipe, of the specific gravity 2.3. It rapidly absorbs moisture and carbonic acid from the atmosphere, reducing the air to a state of perfect dryness, and falls into a white powder, which is a mixture of carbonate and hydrate. It has an alkaline reaction. If carbonic acid be present, the effervescence will take place on dissolving the lime in muriatic acid, but not without. Lime is not readily soluble in water, it requiring about seven hundred times its weight of temperate water for entire solution; hot water dissolves it less readily. A thick liquid, called *Milk of Lime* is made by mixing lime with an excess of water. When water is added to lime, it cracks and becomes reduced to powder, with the evolution of heat. *Hydrate of lime* or *slaked lime* is prepared by adding water to quicklime, by small quantities at a time, until it falls to powder; it is white, pulverulent, and much less caustic than lime; it is used principally for preparing chlorinated lime.

Lime is the oxide of calcium, and consists of one equivalent of calcium 20.5, and one of oxygen 8, = 28.5. It forms a very deliquescent salt by reaction with muriatic acid, and a sparingly soluble one with sulphuric, by which it may be determined from other alkaline earths. It is *incompatible* with all acids, acidulous, metallic, and ammoniacal salts, borates, alkaline carbonates, and astringent vegetable infusions.

Properties and Uses.—Internally, see *Aqua Calcis*. Externally, as an escharotic. Mixed with caustic potassa it forms the *Potassa cum Calce*, a powerful caustic, for cauterizing the neck of the uterus, or other parts. This caustic, also known as *Vienna powder* or *paste*, is made by reducing caustic potassa one ounce and a half, and quicklime two ounces, each separately, to powder in a heated mortar; then mix them carefully and rapidly, and keep the mixture in a wide-mouthed bottle with a ground stopper. In using this caustic, the powder must be moistened with a little alcohol, so as to reduce it to a soft paste, which is to be applied to the part to be cauterized. In this case, the potassa only acts upon a circumscribed portion of skin, instead of spreading, as common caustic potassa generally does: but to bound the space still more accurately, it may be surrounded by a ring of diachylon plaster. Dr. Filhos has prepared a caustic of the same agents, which is more easily used, it is called the *Caustic of Filhos*. It is made by fusing together six ounces of caustic potassa, and three ounces of quicklime; the mixture is poured into leaden cylinders inclosed in glass tubes, and which are to be sealed afterward at each end.

In cases where diaphoresis is desirable, without disturbing the patient, it may be effected as follows: Take a piece of lime about the size of a

Sicily orange, wrap around it a wet rag, but not too wet. Around this wrap several thicknesses of dry muslin or cloth. Place one thus prepared on each side of the patient, and by both thighs; it will soon induce copious perspiration.

Off. Prep.—Aqua Calcis; Liquor Calcis; Potassa Cum Calce.

CAMPHORA.

Camphor.

Nat. Ord.—Lauraceæ. *Sex. Syst.*—Enneandria Monogynia.

Camphor is a peculiar concrete substance derived from *Laurus Camphora* and purified by sublimation. It is chiefly brought to this country from Canton, in the crude state, and undergoes purification before it can be used for medicinal purposes.

Description.—*Laurus Camphora* is an evergreen tree of considerable size, with a trunk straight below, but divided above into many drooping, smooth branches, covered with a greenish bark. The *leaves* are alternate, on long footstalks, ovate-lanceolate, somewhat coriaceous, entire, smooth, bright-green and shining above, paler beneath, triple-nerved, with a depressed gland opening by a pore at the axils of the principal lateral veins beneath, and two or three inches in length. *Petioles* an inch to an inch and a half long, slender, smooth. *Panicles* axillary and terminal, corymbose, naked. *Leaf-buds* scaly. *Flowers* small, white, smooth externally, pedicelled, and in clusters.

History.—The Camphor tree is a native of Japan, China, the East Indies, etc. It is an aromatic tree, all parts of it yielding the odor of camphor. Camphor is obtained in Japan by cutting the wood, roots, etc., of the tree in small pieces, boiling them in water, in large iron vessels, over which are placed earthen capitals, containing rice-straw cones. The heat sublimates the camphor, which rises into the capital and condenses upon the straw. In China, the process is somewhat different; the pieces of the tree are boiled in water until the camphor concretes upon the stick used in stirring; the liquor is then strained and allowed to cool, when the camphor hardens. This is then placed in alternate layers with finely powdered dry earth, in a copper basin, on which another is inverted, and heat being applied, the camphor sublimates and adheres to the upper vessel. In this state it is impure, and of a dirty-grayish color, being known as Crude Camphor; it is re-sublimed for pharmaceutical and other uses.

Camphor has a crystalline texture; white, translucent and shining, brittle, but somewhat elastic, of a powerful, penetrating, diffusible odor, and of a pungent, bitter, cooling taste. It cannot be pulverized alone,

but is easily so by the aid of a few drops of alcohol. It slowly evaporates when exposed to the air, and is soluble in alcohol, ether, fixed and volatile oils, and acetic, nitric, and sulphuric acids. Nitric acid converts it into camphoric acid and oil of camphor; sulphuric, into artificial tannin and charcoal. Resins and fats, when heated with it, unite in all proportions. By the application of polarized light, the smallest portion of natural camphor may be distinguished from the artificial camphor (hydrochlorate of camphene). If small fragments of each be placed separately on glass slides, and a drop of alcohol added to each, they dissolve and speedily re-crystallize. If the crystallization of the natural camphor is watched by means of the microscope and polarized light, a most beautiful display of *colored* crystals is seen, while with the artificial camphor nothing of the kind is witnessed. Camphor is lighter than water, and keeps up a constant rotatory motion when small fragments are placed on that fluid. It volatilizes at ordinary temperatures, melts at 288° , and boils at 400° . It is considered to be an oxide of camphogene, or camphene, which is composed of ten equivalents of carbon 60, and eight of hydrogen $8=68$. With one equivalent of oxygen, ($C_{10} H_8 O$) camphene forms camphor; with four, hydrated camphoric acid; and with half an equivalent of hydrochloric acid, artificial camphor.

When camphor is triturated with dragon's blood, guaiacum, galbanum, or assafoetida, the mixture preserves the pilular consistence indefinitely. With benzoin, tolu, mastic, and ammoniac, the mixture becomes soft by exposure to the air. With olibanum, gamboge, euphorbium, amber, and myrrh, the mixture remains pulverulent, though grumous. Assafoetida, galbanum, sagapenum, tolu, dragon's blood, olibanum, mastic, benzoin, tacamahac, guaiacum, and ammoniac, destroy to a greater or less extent the odor of camphor.

Properties and Uses.—In large doses camphor is a narcotic and irritant; in small ones, sedative, anodyne, antispasmodic, diaphoretic, and anthelmintic. It appears to influence chiefly the cerebral and nervous systems, through the agency of which it affects the circulation. Mucous membranes with which it comes in contact are irritated directly, and acceleration of the circulation may ensue as a secondary effect. It is used to allay nervous excitement, subdue pain, arrest spasm, and sometimes to induce sleep. In the delirium, watchfulness, tremors, and starting of the tendons in typhoid conditions, it is of much utility as a nervo-stimulant. In inflammatory affections, as remittent and intermittent fevers, acute rheumatism, etc., it acts beneficially as a diaphoretic and sedative; and is also valuable in gout, neuralgia, dysmenorrhea, after-pains, puerperal convulsions, and painful diseases of the urinary organs, acting as a sedative, anodyne, and antispasmodic. It is often advantageously combined with opium in chordee, and hysteric nymphomania, and all irritations of the sexual organs. By some physicians it is said to act as an aphrodisiac, exciting the urinary and genital organs

causing a burning sensation along the urethra, and voluptuous dreams, by others again, it is used as an antaphrodisiac, and to allay urinary and genital irritations. It is said to be an antidote to poisoning by strychnia. An oleaginous injection of camphor in the early stage of gonorrhea, often allays urethral irritation; also, the tenesmus from ascarides and dysentery, when injected into the rectum. It enters into many embrocations and liniments for rheumatic, neuralgic, and deep-seated pains, cynanche tonsillaris, contusions from blows, sprains, chilblains, chronic cutaneous diseases, and as a stimulant for indolent and gangrenous ulcers. The vapor of camphor, inhaled into the lungs has been found beneficial in asthma and spasmodic cough; and the powder may be used as a snuff for the relief of nervous headache, and catarrh in its commencing stage. The best form of using this agent is the aqua camphoræ. The administration of opium will best counteract the injurious effects of an overdose of camphor. Dose of the powder, one to ten grains. When given in the solid form, it is capable of producing ulceration of the gastric mucous membrane.

Off. Prep.—Aqua Camphoræ; Emplastrum Plumbi Compositum; Emplastrum Resinæ Compositum; Emplastrum Calefaciens; Linimentum Camphori Compositum; Linimentum Saponis Camphoratum; Linimentum Olei Compositum; Linimentum Capsici Compositum; Linimentum Opii; Mistura Camphoræ Composita; Mistura Copaibæ Composita; Pulvis Ipecacuanhæ et Opii; Pilulæ Camphoræ Compositæ; Tinctura Camphoræ; Tinctura Camphoræ Composita; Tinctura Serpentariæ Composita; Tinctura Opii Acetata; Unguentum Plumbi Compositum.

CANELLA ALBA.

Canella.

Nat. Ord.—Meliaceæ or Canelleæ. *Sex. Syst.*—Dodecandria Monogynia.

BARK.

Description.—Canella Alba is a tree with a very straight and upright stem, growing from ten to fifty feet in height, and branched only near the top. It is covered with a whitish bark; the inner bark is thick, smooth, pale, with a pungent, aromatic taste, dry and crumbling between the teeth. The branches are erect and spreading; the leaves are petiolated, irregularly alternate, oblong, obtuse, entire, of a dark-green color, shining and coriaceous, dotted when young, opaque when old. The flowers grow at the extremities of the branches in clusters, they are small, of a violet color, and are seldom fully expanded. The calyx is five-leaved and persistent; the sepals are roundish, smooth, concave, and membranous. The petals are much longer than the sepals, oblong,

erect, concave, thick, deciduous, two somewhat narrower than the others. *Stamens* monadelphous, forming an urceolate tube, to the outside of which the anthers adhere. The *ovary* is superior, ovate, three-celled, bearing a cylindrical style with three convex, blunt stigmas. The fruit is an oblong, fleshy, smooth, black berry, which is three-seeded, or by abortion one-celled, and one or two-seeded. The seeds are exalbuminous, with linear cotyledons.

History.—A South American tree; the bark is of a pale orange yellow color externally, and yellowish white on the inner surface, with an aromatic odor, and a warm, bitterish, very pungent taste. Alcohol extracts its active properties, giving a bright-yellow tincture, which is rendered milky by the addition of water. It pulverizes readily, yielding a yellowish-white powder. By distillation with water, a large proportion of a fragrant, essential oil is obtained, of a reddish or yellowish color. It contains two oils, mannite, bitter extractive, resin, gum, starch, albumen, and various saline substances.

Properties and Uses.—Aromatic stimulant and gentle tonic. Useful in debilitated conditions of the digestive organs; generally prescribed in combination. In the West Indies it is used as a condiment, and has been advised in scurvy. Some smokers add this bark to their smoking-tobacco to remove the unpleasant odor from the tobacco, and to impart a degree of fragrance to their smoking-rooms.

CANNA.

Canna Starch.

History.—Canna Starch, called by the French "*Tous les Mois*," is the fecula of an undetermined species of *Canna*. Some suppose it to be obtained from the root or rhizome of the *Canna Coccinea*, and others of the *Canna Edulis*. Both suppositions, however, are very uncertain.

Canna Starch comes from the West India island, St. Kitts. Be its origin what it may, it is an excellent arrowroot. It is in the form of a light, beautifully white powder, with a satiny appearance, very unlike the ordinary forms of fecula; it looks more like potato-starch than any other variety of fecula, and its granules are larger, being from the 300th to the 200th of an inch in length. Under the microscope these granules are oval or oblong, usually more or less ovate, with numerous, regular, closely set, and unequally distant concentric rings, and a circular hilum, usually at the smaller extremity, and occasionally double, from which proceed the cracks observable in some of the larger grains. This starch has the ordinary chemical properties of common starch, and forms, when prepared with boiling water, a stiff jelly.

Properties and Uses.—Canna starch forms a nutritious and wholesome food for infants and invalids. It may be prepared in the same manner as arrowroot, and may be used in the same cases. By many it is preferred to any other kind of arrowroot.

CANNABIS SATIVA.

Hemp.

Nat. Ord.—Urticaceæ or Cannabinaceæ. *Sex. Syst.*—Dioecia Pentandria.

THE DRIED TOPS AND RESIN.

Description.—Cannabis Sativa is an annual plant, growing about three feet high, covered with a very fine, rough pubescence, scarcely visible to the naked eye. The *stem* is erect, branched, bright-green, angular. The *leaves* are alternate or opposite, on long, lax petioles, digitate, scabrous, with linear-lanceolate, sharply-serrated *leaflets*, tapering into a long, smooth, entire point; *stipules* subulate. *Flowers* in axillary clusters, with subulate bracts; the males lax and drooping, branched and leafless at the base; females erect, simple, and leafy at the base. *Calyx* of male, downy; of female, covered with short brownish glands. *Achenium* ovate, one-seeded; *seeds* roundish-ovate, somewhat compressed, about the eighth of an inch long, of a shining gray color, inodorous, and of a disagreeable, oily, sweetish taste.

History.—Hemp is a native of Persia and the northern parts of India, whence it has been introduced into many other countries. The hemp of this country is identical with the eastern plant in its botanical characters, but differs somewhat from it in its physical qualities, the India plant being more powerful in its action on the system, and which is probably owing to the influence of climate, cultivation, etc. In the eastern countries an infusion of hemp is much employed as an intoxicating drink; and it is smoked the same as tobacco, with which it is frequently mixed. An alcoholic extract of the dried tops is the form employed in medicine, which is made by passing the vapor of boiling alcohol from the boiler of a still into the dried plant contained in a convenient receptacle, and evaporating the condensed liquor at a temperature not exceeding 150° F. The concrete resinous exudation of the plant is known in India by the name of *Churrus*.

Properties and Uses.—Narcotic, and may be used in place of opium in all cases where that drug disagrees with the patient. The *churrus* is said to alleviate pain, exhilarate the spirits, increase the appetite, produce decided aphrodisia, and cause sleep; and in large doses, to occasion intoxication, a peculiar kind of delirium and catalepsy. The preparation

most used is the alcoholic extract; if of good quality, half a grain or a grain will affect the system, while that of the shops will require from ten grains to half an ounce. Alarming effects have been produced by over-doses. Very favorable reports have been made of its effects in cholera, neuralgia, rheumatism, tetanus, and insanity. A tincture of the extract, made by dissolving three grains in a fluidrachm of proof spirit has likewise been used with advantage—the dose to correspond with that of the extract. Ten drops of it every half hour have been administered in cholera; and have been successfully employed in menorrhagia, which had resisted all ordinary means for months; it has also proved serviceable in uterine hemorrhage. The following is said to be a certain cure for gonorrhea: take, while in blossom, equal parts of tops of the male and female hemp, *Cannabis Sativa*, bruise them in a mortar, and express the juice, to this add an equal portion of alcohol. Dose, from one to three drops every two or three hours. The green plant collected in the spring, and two or three twigs placed in or between beds, will, it is asserted, certainly and effectually cause bedbugs to remove from the room in which they are used.

CANTHARIS VESICATORIA.

Cantharides.

CANTHARIS. Class Insecta. Order Coleoptera, Linn.—Family Trachelides. Tribe Cantharideæ, Latreille.

Gen. Ch. Tarsi entire; nails bifid; head not produced into a rostrum; elytra flexible, covering the whole abdomen, linear semicylindric; wings perfect; maxillæ with two membranaceous laciniae, the external one acute within, subuncinate; antennæ longer than the head and thorax, rectilinear; first joint largest, the second transverse, very short; maxillary palpi larger at tip.—*Say*.

History.—There are a number of insects inhabiting various sections of the world which possess acrid properties, and which, when applied to the skin produce vesication; the most common in use are those under present consideration, Spanish Flies, or Cantharides, the *Cantharis Vesicatoria* of Latreille, *Meloë Vesicatorius* of Linnæus, or *Lytta Vesicatoria*, and *Cantharis officinalis* of other naturalists. At what period they were introduced into the practice of medicine is a matter of uncertainty. The Spanish fly is a native of Europe, and is imported into this country from Messina and St. Petersburg. Those from Russia are the best, and may be known by their greater size, and somewhat copper color. This insect may be distinguished from other analogous ones, by presenting two wing covers of a shining-green color, long and flexible, which cover two membranous wings of a brownish color; the head is large

and heart-shaped, having two thread-like, black, jointed antennæ; the thorax is short and quadrilateral, and along the head and chest is a longitudinal furrow. The fly is about six or ten lines long, and weighs about two grains and a half. They have a peculiar, disagreeable odor, and a faint resinous taste, followed by acridity. In the countries which they inhabit they are found on certain trees as the elder, plum, rose, white poplar, privet, elm, lilac, ash, and honeysuckle, the leaves of which serve them as food. In the state of larva, they inhabit the earth, and prey upon the roots of plants. In the months of May and June, they come forth in swarms in the form of flies, and fill those trees and shrubs which they prefer. At this season they are collected, which is attempted at dawn, when they are torpid from the cold of the night; to undertake their removal in the day-time would be a serious measure. Those who gather them being protected with masks and gloves, shake them from the trees and receive them into sheets spread below; they are then immersed in vinegar or exposed to the vapor of boiling vinegar, spirit, or turpentine, for the purpose of killing them, after which they are quickly dried in the sun, or in heated apartments, and when perfectly dried, are put into casks or boxes lined with paper, and closed so as to exclude as much as possible the atmospheric moisture. It abounds the most in Spain, Italy, Southern France, Southern Russia, Sicily, and is found to some extent in all the South of Europe and in Western Asia.

When dried the flies present the form and color above described, together with the disagreeable odor of the living insect, and an acrid, burning, and urinous taste. They are easily pulverized, the powder presenting a dirty grayish-brown color, interspersed with numerous shining-green particles, the fragments of the feet, head, and wing covers. And as these particles resist the process of putrefaction for a long time, they may consequently be detected in the stomach many months after death occurring from the internal administration of cantharides. When kept perfectly dry, and well closed, the vesicating property of the flies may be preserved for many years. Hence they should always be kept in well stoppered bottles, and powdered only as required. If purchased in powder they may have lost their activity, or suffered from adulteration with euphorbium, or some other insects. To preserve them from insects, various means have been advised, as the introduction of a few lumps of camphor into the vessel containing them, or the addition of carbonate of ammonia, or a few drops of strong acetic acid. Exposing them for half an hour in glass bottles, to the heat of boiling water, destroys the insects and eggs, without impairing the virtues of the flies; of course they must not be allowed to come in contact with the water. The properties of the fly are much diminished by the insects which feed upon them.

Cantharides powder yields its active properties to boiling water, acetic acid, alcohol, proof spirit, ether, the fixed and volatile oils. The active

principle is a white, crystalline substance, termed *Cantharidin*, which is soluble in ether, acetic acid, fixed and volatile oils, and in alkaline solutions. It is in small, white, pearly prisms, which are neutral, insoluble in water and cold alcohol, but soluble in ether, alkaline solutions, acetic acid, the oils, and in boiling alcohol which deposits it upon cooling; it fuses at 210° , volatilizes at a higher heat without decomposition, and evaporates slowly at atmospheric temperatures. It is said to exist principally in the trunk and soft parts of the body, and may be obtained by exhausting powdered cantharides with cold rectified spirit, by percolation, concentrating the tincture till most of the alcohol is expelled, and allowing the residue to rest for a long time until crystals form. It may be freed from impurities by elutriation with a little cold rectified spirit, which scarcely acts on crystallized cantharidin; and it may be obtained quite pure by re-dissolving them in boiling rectified spirit, adding animal charcoal, and re-crystallizing them by rest and cooling. Ether is, however, preferred to alcohol in preparing these crystals, as it dissolves less of the green oil, which is very difficult to separate. The composition of cantharidin is carbon 61.68 per cent., hydrogen 6.04, and oxygen 32.28, or $C_{10}H_6O_4$.

Cantharides are found to contain in addition to their active principle, a *green oil*, insoluble in water, soluble in alcohol, and inert as a vesicatory; a *black matter*, soluble in water, insoluble in alcohol, and inert; a *yellow viscid matter*, soluble in water and alcohol, and inert as a vesicant; a *fatty matter* insoluble in alcohol; phosphates of lime and magnesia, acetic acid, etc. Although cantharidin is insoluble in water and cold alcohol, yet the decoction and tincture of cantharides possess the active properties of the insect, which is owing to the presence of the yellow matter combined with it. The best menstruum for cantharides is sulphuric ether, which dissolves only the active constituents.

Properties and Uses.—In large doses, narcotic and irritant; in medicinal doses, stimulant and diuretic. In large doses, its use is dangerous, being attended often by violent inflammation of the alimentary canal and urinary organs, strangury, irritation of the sexual organs, in the female, abortion; also, headache, delirium, convulsions and coma. Twenty-four grains of the powder or one ounce of the tincture have produced alarming symptoms. There is no known antidote to its poisonous effects, which must be treated on general principles. Medicinally, they are sometimes given in chronic gonorrhea, gleet, leucorrhea, seminal weakness, paralysis and chronic inflammation of the bladder. They have also been reputed useful in the anasarcaous swellings succeeding scarlatina, diabetes, scaly cutaneous eruptions, chronic eczema, incontinence of urine, amenorrhea, etc. Thirty drops of solution of potassa, given every hour, is said to be an effectual remedy in cantharidal strangury.

Dose, of powdered cantharides, half a grain to two grains. (*See Tinctura Cantharidis.*)

Externally, cantharides cause redness, vesication, suppuration or sloughing, according to the length of contact with the integuments. Their most general use is to produce vesication. Blisters are sometimes beneficial in tic-douloureux, sciatica, local chronic inflammations, diseases of the brain, chest and abdomen, to excite the languid action of vessels, in recession of exanthematous affections, and to rouse from general defective sensibility, as in typhoid fever. In their application to children, much care should be observed, especially in typhoid conditions, exanthema, and where a tendency to sloughing exists. A piece of white paper soaked with the *Cantharidin*, which is greenish and liquid, laid on the part, and covered with a compress, and confined by means of a bandage, will vesicate in three or four hours. A vesicating oil has been recommended by E. Dupuy, prepared as follows: To one part of pulverized cantharides add in a close vessel, a mixture of chloroform and castor oil of each, by weight, one and a half parts; after some hours transfer the ingredients to a glass apparatus, and displace the liquid in the usual way; it will amount to about two-thirds of the original bulk of the liquid employed. A few drops of this vesicating oil applied to the arm of an adult will produce a perfect blister in about eight hours. It is easy of application on any surface, holds the vesicating agent free from the disagreeable concomitants of the ordinary fly-blisters, and retains the cantharidin in a soluble state. Its action will probably be favored by the use of oil-silk over the application of it to the skin.

Off. Prep.—Tinctura Cantharidis; Emplastrum Cantharidis.

CANTHARIS VITTATA.

Potato Fly.

Description.—The Potato Fly is found principally in the middle and southern States; it makes its appearance in July and August, and feeds upon the potato plant. Some seasons the fly exists in great numbers. It resembles the Spanish Fly, though somewhat smaller, being about five or six lines in length. Its head is of a light-red color, with dark spots upon the top; the antennæ are black; the elytra or wing covers are also black, with a central yellow longitudinal line, and yellow margins; the thorax is black, with three yellow lines; and the abdomen and legs are covered with an ash-colored down. During the season of their appearance, they may be found on the plant in the morning and evening, but during the heat of the day, they descend into the soil. They may

be collected by shaking them from the plant into hot water, after which they should be carefully dried in the sun.

History.—The Potato Fly, though not so much employed as the Spanish Fly, is fully equal, if not superior to it as a vesicant; indeed, its effects are found to take place more promptly than with the foreign insect, which may, probably, be owing to its greater freshness.

There are several other species of blistering fly in the United States, which are, probably, not at all inferior to cantharides; as the *Cantharis Cinerea*, or ash-colored cantharis which inhabits the northern and middle States; the *C. Atrata*, or black cantharis, common to the northern and middle States, and likewise found in Barbary; the *C. Marginata* of the middle and eastern States, and which feeds on the various species of clematis, and also on the cimicifuga; and likewise the *C. Alvida*, *C. Nuttalli*, etc.

Properties and Uses.—The vesicating property of all these insects, is very likely owing to the presence of the same proximate principle, and therefore they may be applied to the same purposes, and administered in the same doses and preparations as the Spanish Cantharis.

CAOUTCHOUC.

Gum Elastic. Indian Rubber.

Nat. Ord.—Euphorbiaceæ. *Urticaceæ.* *Sex. Syst.*—Monœcia Syngenesia.

THE GUM.

Description.—The tree (*Ficus Elastica*) from which Caoutchouc is obtained has a trunk from two feet to two-and-a-half in diameter, and from forty to sixty feet high. The *leaves* are alternate, approximated, three foliolate, articulated at the top of a long slender stalk, convex below, furrowed above, and swelled at its base; *leaflets* smooth, oval, acute, green above, cinereous beneath. *Flowers* monœcious. *Calyx* five-cleft. *Fruit* oblong, greenish, three-cornered, broadest at base, tricoccous, each coccus opening with two valves. *Seed* ovate, brownish variegated with black, with a thin, brittle testa, and a sweet, nut-like pleasant kernel.

History.—This substance is the coagulated or inspissated juice of several tropical trees, the *Siphonia Cahuchu*, *Siphonia Elastica*, *Jatropha Elastica*, and *Hevea Guianensis*, all of which are supposed to be identical. On being wounded, the juice flows out, which is dried on molds of clay, and which comes to us in various shapes. It is generally blackened by smoke, but when pure is nearly colorless; in thin layers, transparent, highly elastic, lighter than water, without taste or

smell, insoluble in water, alcohol, weak acids and alkaline solutions. It dissolves in pure ether, oil of turpentine, naphtha, coal-tar naphtha, bisulphuret of carbon, and volatile oils. Its solutions in ether, oil of turpentine, and coal-tar naphtha, when dried up, leave the gum in an elastic state, and on this principle water-proof cloth is made; the same is said to be the case with its solutions in the oils of lavender, sassafras and cajuput. Under exposure to heat, caoutchouc first melts, and then distils, yielding a mixture of several oily liquids, all of which, as well as pure caoutchouc itself, are carbo-hydrogens.

Caoutchouc is not affected by atmospheric air, chlorine, muriatic or sulphurous acid gas, or ammonia. It consists of 87.2 parts of carbon, and 12.8 of hydrogen.

Caoutchoucine is said to be the lightest fluid known, and yet its vapor is denser than the heaviest of the gases. It is prepared by cutting India rubber into small pieces containing about two cubic inches each, placing them into a cast-iron still connected with a well-cooled worm-tub, or any flat vessel with a large evaporating surface, the entire top of which can be removed for the purpose of cleaning it out. Heat is to be applied in the usual way, until the thermometer ranges at about 600° F., when as it progresses upward to this temperature, a dark-colored oil or liquid is distilled over. When the thermometer reaches 600° or thereabouts, nothing is left in the still but dirt and charcoal. This oil is to be rectified, and thereby obtaining fluids varying in specific gravity, the lightest of which has not been under .670. At each rectification the color becomes brighter and paler, until at about specific gravity .680 it is colorless and highly volatile. It must be rectified with one-third its weight of water. To enable the dirt to be removed from the bottom of the still with greater ease, throw in common solder to the depth of about half an inch; when this becomes fused the dirt is easily taken off. The disagreeable smell of this liquid may be removed by shaking it up with nitro-muriatic acid, in the proportion of four fluidounces of the acid to one gallon of the liquid. Mixed with alcohol, caoutchoucine dissolves all the resins, especially copal and india rubber, at the common temperature of the atmosphere, and it speedily evaporates, leaving them again in the solid state. It mixes with oils in all proportions. It promises to be a very valuable article for the solution of resins in the manufacture of varnishes, and for liquefying oil-paints with instead of turpentine. Being very volatile it requires to be kept in close vessels.

When caoutchouc is immersed in a bath of fused sulphur, heated to various temperatures, by absorbing the sulphur, it assumes a carbonized appearance, and finally acquires the consistency of horn; this is termed *Vulcanized caoutchouc*. The same vulcanized condition can also be produced either by kneading the india rubber with sulphur, and then exposing it to a temperature of 190°,—or by dissolving the india

rubber in any known solvent, as turpentine, previously charged with sulphur. Thus treated, caoutchouc remains elastic at all temperatures ; in its ordinary state it is quite rigid at a temperature of 40° ; it is not affected by any known solvents, nor by heat short of the vulcanizing point, and acquires extraordinary powers of resisting compression. A cannon ball was broken to pieces by being driven through a mass of vulcanized caoutchouc, which exhibited no other trace of its passage than a scarcely perceptible rent. This article may be used for various useful purposes, as springs for locks, ornaments, bottles for volatile fluids, as a covering to protect wires from corrosion in sea or on land, life-boats, etc.

Properties and Uses.—Caoutchouc is much used for erasing pencil marks ; in forming flexible tubes for chemical purposes, and catheters and bougies for surgical uses. Melted, it is applied as a luting to the joints of chemical apparatus ; in the shape of thin layers, for covering the mouths of bottles, and for other purposes in which the exclusion of air and moisture is requisite. Heated and softened by the flame of a taper, it may be applied, but not while hot, to the cavity of a decayed tooth to relieve toothache, also over leech-bites, to suppress hemorrhage. It has been given in doses of one or two grains, gradually increased, in phthisis, but is seldom or never employed internally. Externally, it has been used as an ingredient of sticking plasters and liniments. Caoutchouc dissolved in oil of origanum or cajuput, and spread upon oil-silk or cloth, and allowed to dry, forms an excellent stimulating plaster for many local difficulties.

CAPSICUM ANNUUM.

Cayenne Pepper.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

FRUIT.

Description.—This is an annual plant, with the *stem* herbaceous, crooked, smooth, somewhat angular, branching above, and growing from one to three feet high ; the *leaves* are ovate or oblong, acuminate, smooth, entire, sometimes hairy on the veins underneath, of a dark-green color, and supported on long petioles. The *flowers* are white, solitary, and stand on long, curved, axillary peduncles. The *calyx* is persistent, tubular, and five-lobed ; the *corolla* is monopetalous, wheel-shaped, with a five-cleft limb. The *stamens* are five, with dark colored, oblong *anthers*. The *ovary* is ovate, supporting a filiform style, and terminating in a blunt *stigma*. The *fruit* is a long, pendulous, inflated

pod or berry, light, smooth, shining, of a bright scarlet, orange, or yellow color, with two or three cells, containing a spongy pulp, and numerous whitish reniform seeds.

History.—There are several species of *Capsicum*, as the *C. Annuum*, *C. Frutescens*, *C. Baccatum*, *C. Minimum*, etc. They are natives of the East and West Indies, and of most hot climates throughout the globe, and are cultivated in this country. They all agree in producing a shining vesicular berry of a greenish, yellowish, cherry-red, or most generally scarlet color, consisting of a thin, fleshy, inflated, bilocular, or trilocular capsule, and many small, flat, reniform seeds. The Bird Pepper, *C. Minimum*, is usually deemed the best; the *C. Annuum* and *C. Baccatum* are the most extensively used. The flowers appear in July and August, and the fruit ripens in October. The long, conical, pointed, recurved fruit is that usually employed in medicine.

All the varieties of *Capsicum* have a faint, peculiar odor, and a hot, acrid taste, which in some is so intense that the smallest fragment, when chewed, will excite an insupportable glow of pungency and heat over the whole mouth and throat. This acridity is imparted to hot water, ether, spirit, vinegar, and fixed oils. Powdered Cayenne Pepper, of good quality, is of a bright color, varying from a beautiful red to a brown or yellow, which fades on exposure to light—the color will assist much in judging the quality of the article. The active principle is termed *Capsicin*. It may be obtained by freeing the fruit from the seeds, submitting it to the action of alcohol, and evaporating the filtered tincture. During the evaporation a red-colored wax separates, and the residuary liquor by further evaporation affords an extract, to which sulphuric ether is to be added. This dissolves the capsicin, which may be obtained by evaporating the ether. It is a yellowish-brown, or reddish-brown oleaginous substance, of an overpowering acrid taste, volatilizes at a moderate elevation of temperature, and disengages so acrid a vapor, that half a grain will cause every person in a large room to cough and sneeze violently. It is slightly soluble in water and vinegar, and very soluble in alcohol, ether, oil of turpentine, and the caustic alkalies, which it renders reddish-brown. The other constituents of capsicum are coloring matter, an azotized substance, gum, pectic acid, and saline matters. It is frequently adulterated with sawdust, cantharides, and red-lead. This last may be detected by placing a portion of the suspected powder in some dilute nitric acid, allow it to digest, then filter, and if any oxide of lead be present, the addition of a solution of sulphate of soda, will throw down a white precipitate.

Properties and Uses.—*Capsicum* is a pure, powerful stimulant. The infusion is much used in colds, catarrh, hoarseness, etc. In dyspepsia, it stimulates the nerves of the stomach, promotes the secretion of the digestive juices, and assists peristaltic motion. It forms an excellent

addition to quinia in intermittents, where there is a deficiency of gastric susceptibility. It has been also used in spasmodic affections, passive hemorrhages, especially uterine, and when combined with the compound powder of ipecacuanha, will, in many instances, arrest hemorrhage after parturition, promptly. It has been used successfully in Asiatic Cholera. A preparation made by adding one ounce of powdered Capsicum, and two ounces of salt to one quart of vinegar, has been found an excellent anti-emetic, in all cases of vomiting or nausea. To be given in tablespoonful doses, as often as required. It has received the name of *Anti-emetic drops*. Capsicum may be used wherever a pure stimulant is indicated, in all cases of diminished vital action, and may be combined beneficially with other remedies, in order to promote their action, as emetics, cathartics, diaphoretics, tonics, etc. Dose of the powder, from one to six grains; of the tincture, from half to one drachm.

Externally, the infusion and tincture have been found valuable as a stimulant gargle in the ulcerated throat of scarlatina, or in chronic cynanche tonsillaris; also as a counter-irritant, as an application to indolent ulcers, and in chronic ophthalmia. It enters into various tinctures and liniments. The concentrated tincture of capsicum has been highly recommended in the treatment of chilblains and toothache. In the former a piece of sponge or flannel must be saturated with it, and rubbed well over the seat of the chilblain, until a strong tingling and electrical feeling is produced. This application should be continued daily, until the disease is removed; relief will be experienced on the very first application, and frequently there will be a total removal of the disease after the second or third application. This, however, will depend upon the severity of the case. This medicine possesses an extraordinary power in removing congestion by its action upon the nerves and circulation; if the skin is not broken, it never causes excoriation by rubbing with it. For toothache, place a drop or two of the tincture on cotton, and apply it to the affected part, the relief will be immediate. *Tinctura capsici concentrata*, is prepared by macerating four ounces of capsicum in twelve ounces of rectified spirit for seven days—then filter.

The *Ethereal Oil of Capsicum*, prepared by the evaporation of a saturated ethereal tincture of the pods, is sometimes used as a rubefacient. It is of a brilliant yellowish color, with a peculiar odor and aromatic taste, and filled with crystals of *capsicin* of curious dendroid forms.

Off. Prep.—*Emplastrum Calefaciens*; *Linimentum Olei Compositum*; *Linimentum Camphori Compositum*; *Linimentum Capsici Compositum*; *Pulvis Lobeliæ Compositus*; *Pilulæ Camphoræ Compositæ*; *Pilulæ Valerianæ Compositæ*; *Tinctura Capsici*; *Tinctura Lobeliæ et Capsici*; *Tinctura Myrrhæ Composita*; *Tinctura Camphoræ Composita*; *Tinctura Viburni Composita*; *Vinum Hydrastis Compositum*.

CARBO ANIMALIS.

Animal Charcoal.

CHARCOAL PREPARED FROM BONES—BONE BLACK, IVORY BLACK.

Preparation.—Animal Charcoal is much used in pharmacy and the arts, and is prepared by subjecting bones to a red heat in close vessels. The bones are usually subjected to destructive distillation in iron retorts or cylinders, and when the ammoniacal liquor called *Bone Spirit* ceases to come over, the residuum is charred bone, or bone-black. In this form it is impure, and although serviceable for many purposes in pharmacy and the arts, yet it will be found unfit for others unless purified. The impurities it contains are phosphate and carbonate of lime, carburet, and siliciuret of iron, and sulphurets of iron and calcium. To purify it, the bone-black in fine powder, is digested in diluted muriatic acid, which dissolves or decomposes all the calcareous compounds as well as sulphuret of iron, with the disengagement of much carbonic acid and some sulphureted-hydrogen. The residuum is then thoroughly washed with boiling water, and contains only charcoal with a small proportion of carburet and silica. The charcoal is now thoroughly dried, at first by a moderate heat, and then at a low red-heat; because its decolorizing power which was destroyed in the previous steps of its purification, is only restored after the action of a pretty strong heat.

History.—Animal Charcoal is a tasteless, insoluble, rather coarse powder, of a dark-brownish-black color. It somewhat resembles vegetable charcoal, but is more dense, and less combustible. Upon long exposure to the atmosphere it absorbs moisture, and loses its decolorizing properties, for which it is chiefly employed. Its decolorizing power is said to depend upon a peculiar aggregation of its particles, induced by the presence of phosphate of lime. It not only removes the coloring principle of vegetable infusions and tinctures, but is likewise capable of taking up their bitter principles, and when purified, takes iodine from solutions containing it, takes numerous salts from their aqueous solutions, and converts chromate of potassa into the carbonate.

Properties and Uses.—It is principally used in pharmacy for decolorizing vegetable principles, as quinia, morphia, etc.; also for clarifying syrups, and for depriving spirits derived from grain of a peculiar volatile oil, called *Grain oil*. It has likewise been highly extolled as an internal remedy, in doses of half a grain to three grains, twice a day, in scrofulous and cancerous affections, goitre, obstinate chronic glandular indurations, etc. Not used in this country medicinally. Like vegetable charcoal, it destroys the odor of putrid animal matter. Dr. A. B. Garrod in a paper read before the Medical Society of London, Nov. 17th, 1846,

recommends purified animal charcoal in cases of poisoning by opium, strychnia, aconite, belladonna, stramonium, tobacco, hemlock, arsenic, etc. First remove as much of the poison as possible by means of the stomach pump, or emetics combined with the antidote, and then give a large quantity of the animal charcoal diffused in warm water; a vegetable emetic must not be used as the charcoal would destroy its emetic property. He considers this agent equal, if not superior to the hydrated sesquioxide of iron, as an antidote to arsenious acid.

CARBO LIGNI.

Charcoal.

Preparation.—Wood, or vegetable charcoal for pharmaceutical or other purposes is made by piling billets of wood in a conical form, and then covering them with earth and sod in such a way as to exclude the access of atmospheric air; several holes must be left at the bottom, and one at the top of the pile, in order to produce a draught to commence the combustion. The wood is to be kindled from the bottom, and when combustion has taken place and the whole pile ignited, the holes at the top and bottom are to be closed, leaving only a limited access of air. By this process, the volatile portions of the wood, consisting of oxygen and hydrogen are dissipated, while the carbon remains in the form of charcoal. From 17 to 18 per cent. of charcoal is obtained by this process; but if the wood be charred in iron cylinders, from 22 to 24 per cent. of charcoal is obtained, beside the collection of pyroligneous acid, tar, and empyreumatic oil, the volatile products of the wood.

For medical purposes, charcoal thus prepared is not sufficiently pure for exhibition, as all the volatile portions of the wood, are not wholly removed. It may be purified, according to Lowitz, by filling a crucible with ordinary charcoal finely pulverized, and luting on a perforated cover. Then expose the whole to a red heat, and continue it as long as a blue flame issues from the aperture in the cover. When this ceases, allow the charcoal to cool, and transfer it quickly to bottles which must be well stopped.

History.—Wood charcoal is a dark-brownish-black powder, composed of shining particles, tasteless and inodorous, insoluble in water, and permanent in the air. It is easily inflammable, and readily consumed, much more so than animal charcoal. It is a good conductor of electricity, but a bad one of heat. If perfectly dry, it absorbs many times its own bulk of certain gases. It corrects the fetor from putrid animal matters, and decolorizes vegetable infusions, but not so promptly as the animal charcoal. It decomposes metallic compounds when heated with them by depriving them of their oxygen. If exposed to the air, it

increases rapidly in weight, in consequence of its absorption of moisture, which takes place to the amount of from ten to fifteen per cent. Combustion disengages its carbonic acid, leaving behind an ash composed of earthy matters and carbonate of potassa.

Properties and Uses.—As a medicine, charcoal should always be purified. It is antiseptic and absorbent. Used in dyspepsia attended with fetid breath and putrid eructations; also in dysentery, to correct the fœtor of the stools. Useful in acidity of stomach, flatulency, obstinate constipation, and in the nausea and constipation attending pregnancy. Dose, from twenty grains to half an ounce, repeated according to indications. Externally, used in poultices to correct fœtor of ulcers, arrest gangrene, etc., and is efficient in many cutaneous diseases. It occasionally enters into tooth-powders, and may be used with advantage to correct the fœtor of the mouth, and cleanse the teeth. In such cases the charcoal prepared from bread is the best, as it contains no gritty particles.

Off. Prep.—Cataplasma Carbonis.

CARTHAMUS TINCTORIUS.

Dyer's Saffron.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

FLOWERS.

Description.—*Carthamus Tinctorius*, sometimes known as *Safflower*, *Bastard Saffron*, etc., is an annual plant, with a smooth stem growing from one to two feet high, striate, and branching at top. The leaves are alternate, ovate-lanceolate, sessile, spinose-denticulate, subamplexicaul, smooth and shining. The flowers are compound, in large, terminal solitary heads. The florets are of an orange-red color, with a funnel-shaped corolla, of which the tube is long, slender, cylindrical, and the border divided into five equal, lanceolate, narrow segments.

History.—This plant is a native of the Levant and Egypt, and is cultivated in many parts of Europe and America. The florets are the officinal part. They are generally met with in flaky masses of a red color, intermixed with the yellow filaments; their odor is peculiar and aromatic, and the taste slightly bitter. The cultivated safflower in this country, is usually sold unpressed, as American Saffron. They contain two coloring matters—one of which is yellow and soluble in water; the other is red, insoluble in water, slightly soluble in alcohol, and very soluble in alkaline solutions, and is called *Carthamine* or *Carthamic Acid*; it is this latter which renders safflower valuable as a dye, especially of silk, and when mixed with finely-powdered talc it forms a *rouge*. Safflower

is often used to adulterate saffron, but may be detected by its tubular form, and the yellowish color of the style and filaments.

Properties and Uses.—Emmenagogue, laxative in large doses, and diaphoretic. Used as a diaphoretic among children in warm infusion, and as a substitute for saffron, in colds, measles, scarlatina, and other exanthematous diseases. To be taken tolerably freely. The infusion may be made by adding two drachms of the flowers to a pint of boiling water. The seeds are white and angular, and have been much used as purgative and emmenagogue. They yield an oil by expression, which has been used as a local application in rheumatic and paralytic affections, also for bad ulcers.

CARUM CARUI.

Caraway.

Nat. Ord.—Apiaceæ or Umbelliferae. *Sex. Syst.*—Pentandria Digynia.

SEEDS, (HALF FRUITS).

Description.—Carum Carui is an umbelliferous, biennial plant, with a fusiform, whitish, fleshy root, and an erect stem, about two feet high, furrowed, and branched above. The lower leaves are of a bright-green color, petiolate, smooth, bipinnate, with numerous finely-cut leaflets, the segments of which are narrow, linear, and pointed; those of the stem are smaller, opposite, one of them with a dilated petiole, the other sessile. The flowers are numerous, small, of a pale flesh-color, and terminate the branches of the stem in erect umbels, which are generally without an involucre, but are sometimes furnished with one to three involucreal leaflets. The calyx is very small; the petals are five, small and inflexed; the stamens are about as long as the petals, and bear small, roundish, two-lobed anthers; the ovary is ovate, and supports styles which are at first very short, but become elongated. The mericarps are elliptic-ovate, of a grayish-brown color, and are marked with single vittæ.

History.—Caraway is a native of Europe, and has been introduced into this country. It flowers in May and June, and the seeds, which are the officinal portions, are not perfected until the second year, when they become ripe in August. They are obtained by cutting down the plant, and threshing it on a cloth. They are of a brownish color, with five lighter-colored primary ridges, and a vitta in each interval, are about two lines in length, and slightly curved inward. The odor is pleasantly aromatic, and the taste warm, sweetish, and spicy; which properties depend upon a volatile oil, which is officinal, and which may be obtained by distillation. The oil is at first pale, becomes darker by

age, and has the peculiar fragrance and taste of the seed. The virtues of the seed are readily yielded to alcohol or ether.

Properties and Uses.—Aromatic carminative. Used in flatulent colic, especially of children, and as an adjuvant or corrective of other medicines. In substance the dose is from ten to sixty grains. The oil, however, is mostly employed. (*See Oleum Carui.*) The seeds are much used by the cook and confectioner to improve the flavor of cakes and comfits, while at the same time they gently stimulate the digestive organs.

Off. Prep.—Oleum Carui; Tinct. Cardamomi Comp.

CARYOPHYLLUS AROMATICUS.

Cloves.

Nat. Ord.—Myrtaceæ. *Sex. Syst.*—Icosandria Monogynia.

UNEXPANDED FLOWERS.

Description.—Caryophyllus Aromaticus is an elegant tree, rising to the height of fifteen or twenty feet; it is of a conical or pyramidal form, is always green, and the whole plant is glabrous. The branches are numerous, slender, opposite, and more or less virgate. The stem is of hard wood, and covered with a smooth, grayish bark. The leaves are about four inches in length by two in breadth, opposite and decussate, persistent, somewhat coriaceous and shining, with a strong midrib and parallel lateral nerves; ovate-lanceolate, entire, smooth on both sides, with numerous pellucid dots, of a green color, paler beneath, and tapering gradually at the base into a slender footstalk about two inches in length. The flowers exhale a strong, penetrating, agreeable odor, and are in short terminal cymes, trichotomously divided, and jointed at every division. The calyx is superior, and consists of a cylindrical tube, and four ovate, concave, spreading segments; it is first green, but subsequently red, coriaceous. The petals are four, ovate, concave, yellowish-red, larger than the calyx, coherent by their edges, and forming a calyptra which is caducous. In the center of the calyx, and at the top of the ovary, is a quadrangular, elevated line or gland, surrounding, but not embracing the base of the shortish, obtusely-subulate style; around this line, immediately within the petals, the stamens are inserted; these are longer than the petals, and bear small, yellow, ovate-cordate, two-celled anthers. The ovary is oblong, almost cylindrical, two-celled, and many small ovules in each cell. The berry is purplish, elliptical, one or two-seeded. Seed covered with a soft, thin, integument.

History.—A tall and beautiful tree, growing in tropical climates. The flowers are collected in October and November, before they are fully

developed, and consist of a tubular calyx, bearing a roundish bud of unexpanded petals; they are quickly dried in the shade to prevent the escape of volatile oil. The finest kinds are plump, heavy, and dark, and give out oil when squeezed with the nail. They are from five to ten lines long, and from one to one and a half thick, dark-brown externally, yellowish-red internally, of a strong, fragrant odor, and of a hot, pungent, aromatic, permanent taste. Cloves contain volatile oil, fixed oil, a peculiar tannin, gum, resin, fiber, water, and two crystalline principles called *Caryophyllin* and *Eugenin*. They impart their sensible properties to alcohol, spirit, and ether; water extracts only the odor. The active properties reside in the volatile oil, which is of a pale reddish-brown color, darkens by age, and is heavier than water; it is extremely pungent and acrid.

Properties and Uses.—Aromatic, stimulant, and irritant. Used to relieve nausea, or vomiting, flatulency, and to excite languid digestion: chiefly employed to assist or modify the action of other remedies, and prevent a tendency to their producing sickness or griping. Dose, from five to ten grains.

Off. Prep.—Linimentum Olei; Mistura Cajuputi Composita; Oleum Caryophylli; Pilulæ Aloës Compositæ; Tinctura Quinæ Composita; Tinctura Guaiaci Aromatica; Vinum Cinchonæ Compositum.

CASSIA FISTULA.

Purging Cassia.

Nat. Ord.—Fabaceæ, or Leguminosæ. *Sex. Syst.*—Decandria Monogynia.

FRUIT, OR PULP OF THE PODS.

Description.—Cassia Fistula is a large tree growing from twenty to forty feet high, with a trunk of hard, heavy wood, dividing toward the top into numerous spreading branches, and covered with a smooth, ash-colored bark. The leaves are pinnate, alternate, from twelve to eighteen inches long, deciduous. The leaflets are opposite or nearly so, from four to eight pairs, ovate, pointed, smooth, undulated, of a pale-green color, polished on both sides, on short, round petioles, from two to six inches long, and from one and a half to three broad. The flowers are large, fragrant, bright-yellow, on long, slender, smooth pedicels. Racemes axillary, pendulous, simple, one or two feet long. The calyx has five nearly equal, oblong, obtuse, smooth sepals. The corolla consists of five petals, which are oval, unequal, concave, spreading, and waved. The three lower filaments much longer than the others, and having a double curve, but no swelling. Anthers on the three long filaments

oblong, opening by two lines on the face, the other seven clavate, with pores at the small end. *Ovary* filiform, smooth, cylindrical, curved, one-celled, containing numerous seeds. The *fruit* is a woody, dark-blackish-brown, cylindrical pod or legume, a foot or more in length, and about an inch in diameter, with two longitudinal furrows on one side, and one on the other, divided into numerous cells by thin transverse diaphragms, each containing a single, oval, smooth, shining, somewhat compressed seed, imbedded in a viscid, black, sweetish pulp.

History.—Purging Cassia is a native of Upper Egypt and the East Indies, from whence it is supposed to have been transplanted to other parts of the world. It is found in India, Cochin-China, West Indies, and South America. The fruit is the officinal portion. Those pods are to be selected which are the heaviest, and do not rattle when shaken, as they contain the most pulp, which is the part used. To obtain it, the pods are first bruised, and boiling water is poured on them so as to wash out the pulp; the decoction is then strained, and evaporated to the proper consistence. The pulp has a faint, nauseous odor, and a sweet, mucilaginous taste; it contains sugar, gum, a substance resembling tannin, a glutinous principle, and a coloring matter soluble in ether, with a small portion of water. When good it should be black and shining; if kept in a damp place it becomes moldy, and long exposure causes it to turn sour. It keeps longest when preserved in the pod. It is nearly soluble in water, and its active parts are taken up by alcohol.

Properties and Uses.—A mild and effectual laxative, useful in habitual constipation. If administered in large doses it purges, occasioning also nausea, flatulence, and griping. Dose as a laxative, one or two drachms, as a purgative one or two ounces. It is seldom employed except as an ingredient in the confection of senna.

CASSIA MARILANDICA.

American Senna.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Decandria Monogynia.

LEAVES.

Description.—Cassia Marilandica is an indigenous, perennial plant, growing from four to six feet high, with round, striated, smooth, or slightly hairy stems. The *leaves* are alternate, rather long, not numerous, and composed of from six to nine pairs of ovate, lanceolate, smooth, entire *leaflets*, green above, and yellowish-green beneath; the common *petiole* is furnished at the base with a large ovate, stipitate, shining-green gland, terminating in a dark point at the top; which is

sometimes double. The *flowers* are bright yellow, in axillary racemes, on furrowed peduncles; the pedicels are long, glandular, and bracteate. The *petals* are five, concave, very obtuse and unequal, the two lower being the largest. The *stamens* are ten, with yellow filaments, and brown anthers, which open by a terminal pore. The three upper stamens bear short abortive anthers; the three lowermost are long, curved, and tapering into a beak. The fruit or legume is pendulous, from two to four inches long, narrow, arcuated, mucronate, blackish, with a few scattered, reddish hairs, and containing many seeds.

History.—This plant is common to most parts of the United States, in low, moist situations, and flowering from June to the latter part of August, about which time the leaves should be collected, or in the beginning of September. Water or alcohol extracts their virtues. The leaves have a faint odor, and a nauseous taste not unlike that of the foreign senna, to which drug it is not inferior in medicinal activity. They are usually had in compressed packages from the Shakers, who cultivate the plant. Mr. Martin of Philadelphia, found the leaves to contain albumen, mucilage, starch, chlorophylle, yellow coloring matter, volatile oil, fatty matter, resin, lignin, salts of potassa and lime, and a principle analogous to *cathartin*.

The *Cassia Chamæcrista*, Prairie Senna or Partridge Pea, growing on the western prairies, is an excellent substitute for the above; it is likewise known as *Dwarf Cassia* and *Sensitive Pea*.

Properties and Uses.—A safe and efficient cathartic, equal to the imported article, for which it may be substituted. But, owing to the presence of argel leaves, the foreign senna has its activity increased, hence, in giving the American article, the dose will be one-third larger than of the other. Its most convenient form of administration is that of infusion, which should be combined with articles similar to the infusion of imported senna, in order to obviate any tendency to griping. The dose in powder is from half a drachm to two and a half drachms. The infusion may be made by adding one ounce of the leaves, with a drachm of coriander seeds, to a pint of boiling water. Macerate for an hour in a covered vessel, and strain; dose, four or five fluidounces.

CASSIA ACUTIFOLIA.

Senna.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—There are several species of Cassia plant, which are supposed to yield the *Senna*, as the *C. Acutifolia*, *C. Obovata*, *C. Elon-*

gata, *C. Lanceolata*, etc. *Cassia Acutifolia* is a perennial shrub, growing from two to ten feet high, with an erect, woody, smooth, branching, whitish *stem*. The *leaves* are alternate and pinnate, with glandless foot-stalks, and two small, narrow, pointed stipules at the base. The *leaflets* from four to eight pairs to each leaf, are nearly sessile, oval-lanceolate, acute, oblique at their base, nerved, from half an inch to an inch long, and of a yellowish-green color. The *flowers* are bright yellow, and in axillary spikes. The *ovary* is linear, downy, falcate, with a smooth, recurved style. The *fruit* or legume is pendulous, flat, elliptical, obtuse, membranous, smooth, grayish-brown, bivalved; quite straight, about an inch long, and half an inch broad, and divided into six or seven cells each containing a hard, heart-shaped, ash-colored seed. It grows in great abundance in Upper Egypt, and furnishes the greater part of the Alexandria Senna of commerce.

Cassia Obovata, a perennial, is smaller than the above, growing to the height of about eighteen inches; with a *stem* pubescent at the base, and cylindrical. The *leaves* are alternate, equally pinnate, smooth, with two subulate, entire, persistent stipules at the base, and with from four to seven pairs of opposite, nearly sessile, obovate, cuneiform *leaflets*, obtuse but mucronate at the apex, unequal at the base; the uppermost gradually the largest, slightly pubescent. The *flowers* are pale-yellow, and in erect, rather loose axillary racemes. The *legumes* oblong, falcate, membranous, smooth, rounded at each end, with an elevated, interrupted ridge along the middle. The seeds are from six to eight, and heart-shaped. This species grows wild in Egypt, Nubia, Syria, and Senegambia; and has been cultivated in the West Indies, and many parts of southern Europe. It is very nearly identical with the *C. Obtusata* of Heyne. This plant furnishes an inferior senna, known as the Italian or Aleppo Senna.

Cassia Elongata, is an annual, but with care it may be made to live through the year, and to assume a suffruticose character. It has a smooth, erect *stem*, and narrow, equally pinnated *leaves* with from four to eight pairs of lanceolate *leaflets*, which are nearly sessile, slightly mucronate, smooth above, rather downy beneath, oblique at the base, with the veins turned inward so as to form a wavy line immediately within the margin of the leaflet; *petioles* glandless; *stipules* softly spinescent, semi-hastate, spreading, minute. The *flowers* are bright yellow, and arranged on erect, stalked, axillary and terminal racemes, rather longer than the leaves. The *legume* is pendulous, oblong, membranous, tapering abruptly at the base, rounded at the apex, an inch and a half long, and about half an inch broad, with many deep-brown seeds. It is supposed to grow in southern Arabia, and in the interior of India, and is cultivated at Tinnivelly.

Cassia Lanceolata resembles the above, having, however, never more than four or five pairs of *leaflets*, oblong, and either acute or obtuse, not at all ovate or lanceolate, and perfectly free from downiness even when young; the *petioles* have constantly a small, round, brown gland a little above the base. The *Pods* are erect, oblong, tapering to the base, obtuse, turgid, mucronate, rather falcate, especially when young, at which time they are sparingly covered with coarse, scattered hairs. It grows in Arabia, and was considered by Forskhal as the true Mecca Senna.

History.—These are supposed to be the principal species which yield the Senna, though much uncertainty exists with regard to them, arising from the want of correct specimens, the difficulty attending the investigation of the plants in their places of growth, the ignorance of the influences which a change of locality may exert upon them, and whether the presence or absence of the glands on the petioles are to be assumed as specific characters. Although this confusion exists in the botanical history of senna, yet, in commerce, but three varieties of the drug are found, or which are ever imported into this country, these are, the *Alexandrian* or *Egyptian*, which is the finest and most valuable article, the *Indian*, and the *Tripoli Senna*.

ALEXANDRIA SENNA is collected from Sennaar, Nubia, and Upper Egypt, and made up at Boulak, not far from Cairo, under the superintendence of the Egyptian government, from which place it is forwarded to Alexandria, for the European markets. It consists of the leaflets of *C. Acutifolia*, *C. Obovata*, pods, broken leafstalks, flowers, etc., likewise the leaves of *Cynanchum Oleaefolium*, or *Solenostemma argel*. The harvest for collecting commences in September, at which time the branches of the shrub are cut, and exposed to the sun, until the leaves begin to fade; they are then collected into bundles, and placed on rocks and high grounds, in order to have full benefit of the air and of the sun's rays. When the leaves are quite dry, the branches are threshed, and the leaves separated from them, they are then packed in sacks and sent to Boulak, at which place their adulteration with other leaves is said to take place.

As received in this country, Alexandria Senna is generally in bales and barrels, and is considered the finest and most valuable variety; the best and most esteemed is that which contains the least quantity of *cynanchum* leaves, senna leafstalks and pods, where the entire lanceolate leaves are numerous, and where the odor and taste is strong and pure. It has a peculiar but not disagreeable odor, with an unpleasant, nauseous, mucilaginous, and sweetish taste, with hardly any perceptible bitterness, unless it be adulterated with the leaves of the *Argel* or *Cynanchum oleaefolium* which impart bitterness to the powder or infusion, and which is the most important impurity to remove. They may be recognized by having no visible lateral nerves on their under-surface; by being longer, thicker and firmer than senna leaves; by the greater regularity of their

base, being of a lighter color, of a bitter taste, and often spotted with a yellow, bitter, gummy-resinous incrustation.

TRIPOLI SENNA somewhat resembles the Alexandrian, but is considered much inferior to it; the leaves are more broken down, and the leafstalks more numerous. It seems to consist of one of the acute leaved species and a slight admixture of *C. Obovata*, and very seldom contains any adulteration with the argel leaves. There is much uncertainty as to the place from which it is derived.

INDIA OR MOCHA SENNA is of three kinds, the Bombay, the Madras, and the Tinnivelly, of which the first, is usually imported from Bombay, though it comes in the first instance from Mocha and other ports of the Red Sea; the second and third from Madras; of these, the Tinnivelly is esteemed the best. India Senna consists mainly of large, thin, unbroken, acute, yellowish-green leaves, seldom adulterated, and when good, is fully equal to the Alexandrian. There are other varieties, but they seldom reach this market.

Good Senna may be known by the bright, fresh, yellowish-green color of the leaves, with a faint and sickly odor somewhat similar to green tea, and a nauseous, mucilaginous, sweetish, and slightly bitter taste; and the fewer the stalks, seed pods, broken leaves, and dirt, the better is the senna. Its active principles are taken up by cold or warm water, alcohol, and proof spirits; boiling destroys its virtues unless it be in vacuo, or in a covered vessel. Various analyses have been made of senna, but there are none on which we can satisfactorily rely. M. M. Lassaigne and Feneulle found it to contain a peculiar bitter principle called Cathartin, chlorophylle, fixed oil, a small quantity of volatile oil, albumen, yellow coloring matter, mucilage, malate and tartrate of lime, and acetate of potassa, and some mineral salts. The cathartin is a yellowish-red, uncrystallizable substance, of a peculiar odor, and a bitter, nauseous taste, very soluble in water and alcohol, but insoluble in ether. It is considered to be the purgative principle of the drug, yet this is not universally admitted, as several experimenters deny that it possesses any purgative power whatever. The infusion or decoction of senna is *incompatible* with strong acids, alkaline carbonates, lime-water, tartar emetic, acetate of lead and tannin, or astringent plants containing tannin. The tartarized antimony and acetate of lead do not precipitate the cathartin.

Properties and Uses.—Senna is a certain, manageable, and convenient cathartic, very useful in all forms of febrile disease, and other diseases where a violent impression on the bowels is not desired. Its influence is chiefly exerted on the small intestines, augmenting their mucous secretions, exciting increased peristaltic motion, and producing loose brown evacuations. It does not act as a sedative, as is the case with some cathartics, nor as a refrigerant; but has a slight stimulating influence, insufficient however, to contra-indicate its use in cases of general excite-

ment, or reaction. Beside the nauseating taste of senna, it is apt to cause sickness at stomach, and very few persons can use it alone, without experiencing more or less griping pains. The addition of cloves, ginger, cinnamon, or other aromatics are excellent correctives of these unpleasant effects. A teaspoonful of cream of tartar to a teacupful of the decoction or infusion of senna, is a mild and pleasant cathartic, particularly suited for females where it may be required soon after delivery. The addition of neutral laxative salts is another mode, adopted by a certain class of practitioners, of preventing the tormina, and at the same time of increasing the activity of the infusion of senna, as, phosphate of soda, Epsom, or Rochelle salts; these are, however, rarely used by Eclectics. Saccharine and aromatic substances are also sometimes combined for this purpose, as sugar, manna, aromatic seeds, electuary of senna, etc. The purgative effect of senna is much increased by the addition of the pure bitters; the decoction of guaiacum is said to answer a similar purpose. Senna is contra-indicated in an inflammatory condition of the alimentary canal, hemorrhoids, prolapsus ani, etc. The dose in powder is from thirty to fifty grains; in tincture, from half a fluidounce to two fluidounces; electuary, two drachms; and of the infusion, which is the most usual mode of administration, from two to four fluidounces.

A preparation termed *Cassine*, said to be the active principle of the Alexandria Senna, is advertised as a preparation of an eastern manufacturing establishment. It is stated to be a whitish-brown powder, of a slightly bitter taste, a senna-like odor, soluble in water and insoluble in alcohol. I have not seen it, nor have I been able to obtain its mode of preparation.

Off. Prep.—Enema Sennæ Composita; Extractum Rhei et Sennæ Fluidum; Extractum Spigeliæ et Sennæ Fluidum; Extractum Sennæ et Jalapæ Fluidum; Infusum Sennæ; Pulvis Jalapæ Compositus; Tinctura Sennæ Composita.

CASTOREUM.

Castor.

History.—This drug is a peculiar concrete substance obtained from the preputial follicles of the *Castor Fiber*, or Beaver. These follicles are filled with a thick fluid secretion, which slowly concretes when they are removed from the animal. Most of the castor of the present day is derived from the beaver of North America. It has much the appearance of a pair of dried testicles united by their spermatic chords, dark liver brown and wrinkled externally, paler liver brown internally, resinous in fracture, when perfectly dried of a strong, peculiar heavy odor, and of an aromatic, bitter, offensive taste. Rectified spirit is its best solvent; though ether extracts a good part of its virtues.

The Russian castor, from the Russian dominions, is seldom seen in this country; it may be distinguished from the American by being larger, fuller, heavier, and less tenacious, and by its stronger taste and smell. Treated with distilled water and ammonia, M. Kohli states that it affords a white precipitate, while the American throws down an orange-colored matter. Good castor has a strong, fetid, peculiar odor; a bitter, acrid, and nauseous taste, and a color more or less tinged with red. It is composed of numerous salts, mucus, a volatile oil, a resinous substance, a horny matter, osmazome, and a peculiar crystalline, non-saponifiable principle called *castorin*. Age impairs the virtues of castor, which is hastened in an elevated temperature; moisture promotes its rapid decomposition. It should always be kept in a dry cool place. It is not good if quite black, tasteless and inodorous. A factitious preparation is often sold, consisting of a mixture of various drugs, scented with genuine castor, intermixed with membrane, and stuffed into the scrotum of a goat. The feeble odor, want of other characteristic sensible properties, and the want of the smaller follicles containing fatty matter, and which are always attached to the genuine bags of castor, will enable one to detect the fraud.

Properties and Uses.—Moderately stimulant, antispasmodic, and emmenagogue. Used in hysteria, amenorrhea, epilepsy, and many anomalous nervous affections. Dose of the substance, from ten to twenty grains; of the tincture, from half a fluidrachm to two fluidrachms.

Off. Prep.—Tinctura Castorei; Tinctura Castorei Ammoniata.

CAULOPHYLLUM THALICTROIDES. (*Leontice Thalictroides*.)

Blue Cohosh.

Nat. Ord.—Berberidaceæ. *Sex. Syst.*—Hexandria Monogynia.

ROOT.

Description.—This plant, likewise known as *Squaw root*, *Pappoose root*, is a smooth, glaucous plant, purple when young, with a high, round stem from one to three feet in height, simple from knotted and matted rootstocks, and dividing above into two parts, one of which is a triternate leaf-stalk, the other bears a biternate leaf and a racemose panicle of small yellowish-green flowers. The leaves are biternate and triternate; petiole trifid, and supporting nine leaflets. Leaflets oval, petiolate, unequally lobed, the terminal one equally three-lobed, paler beneath, and from two to three inches long. The flowers appear in May and June. Panicle small, shorter than the leaves. Pericarp thin, caducous, dark-blue, resembling berries on thick stipes. Seeds one or two, erect, globose, about the size of a large pea.

History.—A handsome perennial plant growing all over the United States, in low, moist, rich grounds, near running streams, in swamps, and on islands that have been overflowed with water. The seeds ripen in the latter part of the summer, and are said to form an excellent substitute for coffee, when roasted. The fruit is dry, sweetish, insipid, and resembles that of the *Vaccinium*. The officinal part is the root, which is sweetish, somewhat pungent and aromatic, and affords a yellow infusion or tincture. No chemical analysis of the root has been made, though it affords a resinous principle, to which I have given the name of *Caulophyllin*.

Properties and Uses.—This is a favorite agent of American Eclectic physicians, which has not yet become generally known. It is principally used as an emmenagogue, parturient, and antispasmodic; but it likewise possesses diuretic, diaphoretic, and anthelmintic properties. It has been successfully employed in rheumatism, dropsy, colic, cramps, hiccup, epilepsy, hysteria, uterine inflammation, etc. It is a valuable agent in all chronic uterine diseases, appearing to exert an especial influence upon the uterus, and has been found serviceable in uterine leucorrhea, amenorrhea, dysmenorrhea, etc. When used in decoction for several weeks previous to the parturient period, it is said to facilitate that process, acting as a preparatory parturient, and it is sometimes combined with the *Mitchella Repens*, and *Eupatoria Aromaticá*, for this purpose. Combined with equal parts of powdered Hydrastis Can., made into an infusion, and sweetened with honey, it forms an elegant and effectual wash for aphthous sore-mouth and throat. In decoction, blue cohosh is preferable to ergot for expediting delivery, in all those cases where the delay is owing to debility, or want of uterine nervous energy, or is the result of fatigue. The decoction or infusion may be made by adding an ounce of the root to a pint of boiling water, and boiling or macerating for a short time; the dose of either is from two to four fluidounces, three or four times daily. The tincture should be made by adding three ounces of the finely powdered root to a pint of alcohol, and allow it to macerate for fourteen days; then filter. The dose is from half a fluidrachm to two fluidrachms.

Off. Prep.—Caulophyllin; Extractum Caulophylli Hydro-alcoholicum; Tinctura Caulophylli Composita.

CAULOPHYLLIN.

THE ACTIVE PRINCIPLE OF THE ROOT OF CAULOPHYLLUM THALICTROIDES.

Preparation.—Caulophyllin is the name I have given to the active principle of the root of *Caulophyllum Thalictroides*. It is an American Eclectic remedy not yet used by other classes of practitioners, and was

first manufactured by W. S. Merrell of Cincinnati. He prepares it by precipitation from the saturated tincture, similar to the preparation of cimicifugin, using, however, as small a quantity of water as possible to prevent waste, as the precipitate is soluble in water.

Chemical Properties.—Caulophyllin thus prepared is a resinous substance of a light-brown color, with a peculiar, not unpleasant odor, somewhat similar to podophyllin, and leptandrin, and a slightly bitter taste with some degree of pungency. Its chemical reactions have not been thoroughly investigated; it appears, however, to be a neutral substance, like salicin, exhibiting neither acid nor alkaline principles. It is insoluble in ether. In water it is partially soluble, in alcohol more so; the addition of aqua ammonia renders it completely soluble in either menstruum, and the solution becomes of a dark-reddish wine color. Its aqueous solution is also rendered perfect by the addition of liquor potassa, nitric, or muriatic acids. Acetic acid does not solve it.

The N. Y. Journal of Organic and Medical Chemistry, vol. i, p. 12, states that Caulophyllin may be obtained by treating the root of Caulophyllum with distilled water, and obtaining an aqueous solution by percolation. This solution is to be decolorized by animal charcoal, then evaporated in *vacuo*, and precipitated with an infusion of nutgalls, or, what is still better, 96 per cent. alcohol. A white precipitate is obtained, which can be dried on filter-cloth and powdered. The properties of the caulophyllin thus obtained, are similar to those detailed above, being soluble in water, partly so in alcohol, and possessing similar therapeutic influences; yet, it is there termed an alkaloid. It is to be regretted that in our eagerness to discover concentrated medicinal principles and their therapeutic advantages, but little attention is bestowed upon their chemical relations.

Properties and Uses.—Caulophyllin appears to exert a direct influence upon the uterus, acting as an alterative, uterine tonic, and parturient, according to the periods in which it is employed. In the more common unhealthy conditions of this organ and its appendages, known as amenorrhea, dysmenorrhea, passive menorrhagia, leucorrhea, congested cervix, etc., it is equal to, if not surpassing the cimicifugin. A combination of equal parts of caulophyllin, cimicifugin, and carbonate of ammonia, will be found especially valuable not only in the above-named affections but likewise in epilepsy, hysteria, rheumatism and dropsy, in which diseases it has been recommended as an antispasmodic. It may also be advantageously combined with aletrin, asclepidin, senecin, etc., in many forms of disease of the female generative organs. It has been spoken of as a parturient, but we have no knowledge of its influence as such—though we are aware that the root from which it is prepared does exert a parturient effect; which property, if retained by the caulophyllin will no doubt render it valuable to the accoucheur. Added to

podophyllin or other active purgatives, it prevents tormina, and is, probably, the best agent that can be employed for this purpose.

Dr. T. J. Kindleberger of Springfield, O., writes that he has used it with much advantage in after-pains, in menstrual suppression, and in dysmenorrhea. He closes his letter, by observing, "In my opinion it far surpasses ergot, both in its acting more mildly, and with more certain results. It will, no doubt, occupy a very elevated position among remedial agents, when it becomes fully known to the profession." The ordinary dose of the article is from one-fourth of a grain to one grain, two, three, or four times a day. As a parturient it should be given in doses of from two to four grains, and repeated at intervals of from fifteen to thirty or sixty minutes, after actual labor has commenced. In one case, reported, where labor had lasted five days, the patient much enfeebled, and the labor complicated with artificial pains, caulophyllin was given in two grain doses, every half hour; but three doses were given, labor having commenced soon after the second was taken, and terminated successfully in one hour and forty minutes from the time the first powder was given. Caulophyllin may be advantageously combined with dioscorein in bilious colic and flatulence. With podophyllin and muriate of ammonia, it forms an excellent combination for some nephritic diseases, accompanied with pains of a spasmodic character.

CEANOTHUS AMERICANUS.

Redroot.

Nat. Ord.—Rhamnaceæ. *Sex. Syst.*—Pentandria Monogynia.

BARK OF THE ROOT.

Description.—This plant, likewise called *New Jersey Tea*, *Wild Snow-ball*, has a large root, with a red or brown epidermis, containing many small white veins, and tolerably thick; body of the root dark-red. The *stems* are from two to four feet high, slender, suffruticose, with many reddish, round, smooth *branches*, the younger of which are pubescent. The *leaves* are ovate or oblong-ovate, somewhat acuminate at the apex, rounded, or slightly cordate at the base, serrated, three-nerved, nearly smooth above, and whitish, tomentose beneath, the pubescence of the veins and petioles somewhat reddish. The *flowers* are white, in long, crowded panicles from the axils of the upper leaves. *Calyx* white, five-cleft, and the upper portion separates by a transverse line, leaving the tube adhering to the fruit. The *corolla* is formed of five-saccate, arched petals, which are longer than the calyx, and with filiform claws at base. The *stamens* are five, exserted, and bearing ovate, two-celled anthers. The *ovary* is three-angled, and surrounded with a ten-toothed disk.

The *styles* are three, united to the middle, but diverging above. The *fruit* is dry and coriaceous, obtusely triangular, three-celled and three-seeded. The *seeds* are convex externally, concave internally, the cavity marked with a longitudinal line.

History.—*C. Americanus* is found in all parts of the United States, in copses and dry woods, and flowering from June until September. The leaves, when dried, have an odor and taste resembling black tea, and were used during the revolutionary war as a substitute for the Chinese tea; they are slightly bitter and astringent. The root is the officinal part, and has a taste and smell somewhat resembling those of the peach leaf. It has been occasionally used for coloring. Water extracts its active principle. The leaves are said to contain tannin, a soft resin, a bitter extractive, a greenish coloring matter almost identical in color and taste with green tea, gum, a volatile substance, lignin, and an active principle called *Ceanothine*.

This principle, as stated in the New York Journal of Organic and Medical Chemistry, vol. 1, p. 43, is obtained by first removing the resinous extractive, and most of the coloring matter from the leaves, by treating them with alcohol. The mass is then placed in an alembic apparatus, and the alcohol remaining in the leaves displaced, after which the mass is submitted to the percolating process with hot distilled water, until the active principle is displaced. The aqueous solution is then evaporated in *vacuo* to the consistency of thick syrup, and precipitated and purified in alcohol nearly absolute. The precipitate is then placed in *vacuo* at a temperature of about 100° F. By this means the alcohol remaining in the precipitate is gradually removed, and the *Ceanothine* remains in a dried mass partially in the form of crystals, after which it is reduced to a fine powder. When purified it is white; its odor and taste is similar to that of green tea; it is soluble in water, but insoluble in alcohol.

Properties and Uses.—Astringent, expectorant, sedative, antispasmodic, and antisymphilitic. Used in gonorrhea, dysentery, asthma, chronic bronchitis, hooping-cough, and other pulmonary affections. Dose of a strong decoction, one tablespoonful three or four times a day. It has likewise been successfully used as a wash and gargle in the aphthæ of children, sore mouth subsequent to fever, and in ulceration of the fauces attendant on scarlatina.

Off. Prep.—Decoctum *Ceanothi*.

CELASTRUS SCANDENS.

False Bittersweet.

Nat. Ord.—Celastraceæ. *Sex. Syst.*—Pentandria Monogynia.

BARK OF THE ROOT.

Description.—This plant, likewise known by various other names, as *Staff-vine*, *Warwork*, *Climbing Bittersweet*, *Climbing Staff-tree*, etc., is a climbing, indigenous shrub, with a woody, twining stem, without thorns or prickles; the leaves are thin, oblong, acuminate, serrate, alternate, stipulate, petiolate and smooth; the racemes are small, terminal, and axillary; the flowers are greenish-white, or yellowish-white, fragrant and dioecious. Calyx flat, five-lobed; corolla spreading, of five sessile petals; capsule obtusely three-angled, three-celled, berry like; valves bearing the partitions on their centers; stamens standing around a glandular five-toothed disk; style thick; stigma three-cleft. Seeds covered with a scarlet aril, one or two in each cell.

History.—This plant grows in woods and thickets, from Canada to Carolina, creeping on hedges and rocks, or twining about other trees, or each other, and ascending to a great height. It flowers in June, and bears a scarlet berry which remains through the winter. The plant thrives most luxuriously in a rich, damp soil. The root is very long, creeping, woody, of a bright orange color, about half an inch in thickness, with a thick, red, or yellowish-red bark, which is the officinal part. On account of the similarity of name, Bittersweet, the plant has been confounded with the *Solanum Dulcamara*, from which, however, it essentially differs in appearance and therapeutic action. The bark has a sweetish, rather nauseous taste, and imparts its medicinal properties to water.

Properties and Uses.—Alterative, diaphoretic, and diuretic, with some narcotic powers. Used in scrofula, secondary syphilis, chronic hepatic affections, cutaneous affections, leucorrhœa, rheumatism, and obstructed menstruation. Externally, an ointment has been successfully employed in inflamed and indurated breasts of nurses. Dose of the decoction, from two to four ounces, three times a day; of the extract, from five to ten grains.

Off. Prep.—Decoctum Celastri; Syrupus Rumicis Compositus.

CENTAUREA BENEDICTA.

Blessed Thistle.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Frustranea.

LEAVES.

Description.—*Centaurea Benedicta*, or *Cnicus Benedictus* of De Candolle, also known as *Holy Thistle*, is an annual, herbaceous plant,

with a whitish, fibrous, branched, tapering *root*, with several *stems*, about two feet high, and which are trailing, roundish, furrowed, reddish, woolly, and branching toward the top. The *lower leaves* are petiolate, but the upper are sessile, alternate, and somewhat decurrent; the whole are oblong, rough, aculeate, sinuate or almost ruminant, and armed with many sharp spines; of a green color above, and paler and reticulated beneath. The *flowers* are large, of a bright-yellow color, solitary at the ends of the branches, inclosed by a bracteate involucre of ten leaves, the five exterior of which are largest. *True involucre* ovoid, imbricated, smooth, woolly, each scale being terminated by pinnate spines, connected with the bracts by fine threads. *Ray-florets* small and sterile, those of the disk perfect, tubular, and toothed. *Stamens* five, downy, with linear-oblong united anthers. The *style* is filiform with a cleft stigma. The *achenia* are oblong, brown, striated, on a bristly receptacle.

History.—This is a native of the south of Europe, and naturalized in the United States. It flowers in June, when its medicinal virtues are in the greatest perfection. The leaves should be gathered while the plant is in flower, quickly dried, and kept in a dry place. They have a feeble, unpleasant odor, and an intensely bitter taste. Water or alcohol extracts their virtues. The infusion with cold water is a pleasant bitter; the decoction is nauseous and offensive to the stomach. The leaves contain volatile oil, a bitter principle, resin, a fixed oil, gum, sugar, albumen, some salts, etc. The bitter principle is supposed to be the active one of the plant, and is named *Cnicin*; it is crystallizable, inodorous, very bitter, neutral, hardly soluble in cold water, more so in boiling, and soluble in alcohol. It is analogous to salicin in composition, and consists of carbon, hydrogen, and oxygen. In doses of from four to eight grains it often vomits and has proved useful in intermittent fevers.

Properties and Uses.—A cold infusion is tonic; a warm infusion diaphoretic, and if strong, emetic. Used as a tonic in loss of appetite, dyspepsia, and intermittent diseases. Dose of the powder, from ten to sixty grains; of the infusion two fluidounces.

Off. Prep.—Infusum Centaureæ.

CEPHAËLIS IPECACUANHA.

Ipecacuanha.

Nat. Ord.—Cinchonaceæ. *Sex. Syst.*—Pentandria Monogynia.

ROOT.

Description.—Cephaelis Ipecacuanha is a small shrubby plant, with a perennial *root*, descending obliquely into the ground, from four to six

inches long, about as thick as a goosequill, simple, or divided into a few divergent branches, marked with annular rugæ, flexuose, contorted, epidermous, glabrous, of a pale-brown color in the recent root, and umber or blackish-brown in the dry; the *cortex* is soft, white, and sub-amylaceous in the fresh root, and pale-reddish, or rose-colored in the dried state, of a shining and resinous fracture, and readily separable from a central woody axis. The *stem* is suffruticose, from two to three feet long, ascending, often rooting near the ground, smooth and cinereous at the base, downy and green near the apex. The *leaves* are rarely more than four or six on a stem, oblong-ovate, acute, roughish with hairs, from three to four inches long, and from one to two broad; those at the top of the stem are opposite, and those toward the base alternate. *Petioles* short, downy. *Stipules* erect, appressed, membranous, deciduous, four to six cleft. *Peduncles* solitary, axillary, downy, erect when in flower, reflexed when in fruit, about one inch and a half long. *Flowers* small, white, in semiglobose heads, of eight, twelve or more; *involucre* one-leafed, spreading, deeply four to six-parted, with obovate acuminate, ciliated segments. *Bracts* to each flower one, obovate-oblong, acute, downy. *Calyx* minute, obovate; whitish, adhering to the ovary, with five-bluntish, short teeth. *Corolla* white, funnel-shaped; *tube* cylindrical, downy on the outside and at the orifice; *limb* shorter than the tube, with five ovate reflexed segments. *Stamens* five; *filaments* filiform, white, smooth; *anthers* linear, longer than the filaments, projecting a little beyond the corolla. *Ovary* with a fleshy disk at the apex; *style* filiform; *stigmas* two, linear. *Berry* ovate, obtuse, about the size of a kidney-bean, at first purple, subsequently violet-black, two-celled, two-seeded, with a longitudinal fleshy partition. *Nucules* plano-convex, furrowed on the flat side.

History.—This is a small, scrubby, perennial plant, found in the moist shady woods of Brazil, and other sections of South America, but mostly between the eighth and twentieth degree of south latitude. It flowers in January and February, and ripens its fruit in May. The root, which is the officinal part, is collected during the flowering season by the Indians, who after plucking it from the ground, separate it from the stem, clean it, and hang it up in small parcels in the sun for the purpose of drying. It is principally imported from Rio Janerio, Bahia, and Pernambuco, in large bags or bales.

As imported into this country, ipecacuanha is in pieces two or three lines in thickness, contorted, simple or branched, tapering from the center toward both ends, irregular rings or rugæ, separated by narrow fissures frequently extending nearly down to the central fiber. The internal medutullium or woody part is slender, and light straw-colored; the *cortex* or bark is hard, horny, translucent, breaking with a resinous fracture, and easily separating from the central ligneous cord. It is not

very readily pulverized, and is the most active part of the root. Pharmacologists have divided ipecacuanha into three varieties, the grayish-black, the grayish-red, and the grayish-white, which are so named from the relative color of the surface of the roots. But as they are derived from the same plant, and are essentially the same in properties and composition, the division is of no practical utility, especially as they are received into this country often so intermingled, as to render a separation of them almost impossible.

Ipecacuanha root is seldom seen by the druggist or practitioner of this country, except in powder, from which circumstance it is much liable to adulteration. The powder of the genuine article is of a grayish-yellow color, with a faint, bitterish, obscurely acrid taste, and a weak, musty, peculiar odor, which becomes stronger and nauseating during the process of pulverization; in some persons it excites violent sneezing, in others a difficulty of breathing resembling asthma. It yields its properties to water, and still better to alcohol, spirits or wines. Boiling impairs its virtues. The bark of the grayish-black, or dark-brown variety, consists of an odorous concrete oil, wax, gum, starch, lignin, and emetia. The woody part contains but little emetia. The grayish-black variety is supposed to contain more emetia than the grayish-red.

Emetia or *emetine* which is the active principle of the root, is prepared by removing the odorous fatty matter from the powder with ether, then exhausting the residue with boiling alcohol, then evaporating the alcoholic solution to dryness, and finally subjecting the extract to the action of cold water, which dissolves the emetia with some free acid, and leaves the wax and other matters. To separate the acid, and obtain pure emetia, treat the watery solution with magnesia, filter, and evaporate. The salt is thus decomposed, and the organic alkali being insoluble is precipitated with the excess of the magnesia. This precipitate is then to be washed with cold water, and digested in alcohol, which dissolves the emetia; finally the alcoholic solution is evaporated, the residue redissolved in a dilute acid, decolorizing the solution with animal charcoal, and precipitating the emetia by magnesia. Or it may be obtained by treating the powdered root with very dilute sulphuric acid, precipitating with magnesia, and treating the precipitate in the manner above directed.

Pure emetia is whitish, without odor, very slightly bitter, pulverulent, permanent in the air, uncrystallizable, fusible at about 120° , decidedly alkaline, sparingly soluble in cold water and ether, more soluble in hot water, and very soluble in alcohol. It contains nitrogen among its constituents. With acids it forms neutral, soluble, bitter, acrid, and for the most part, uncrystallizable salts, whose solutions are precipitated by gallic and tannic acids. It is supposed to consist of 35 equivalents of carbon, 25 of hydrogen, 9 of oxygen, and 1 of azote, ($C^{35} H^{25} O^9 N$). The root furnishes but a very small proportion of pure emetia.

Tannin, all astringents containing tannin or gallic acid, iodine, salts of iron, and acetate of lead, are *incompatible* with ipecacuanha.

Properties and Uses.—Emetic in large doses ; nauseant and expectorant in smaller ; and in still smaller doses, tonic, stimulant, carminative and diaphoretic. Some authors suppose it to possess narcotic properties. Given in scruple doses, it operates as an active emetic, causing much nausea, continued muscular straining, with a free secretion of mucus ; vomiting, however, seldom takes place, until fifteen or twenty minutes after its administration. It is inferior to no other emetic, being safe even in large doses, seldom producing painful spasms of the stomach or bowels, and causing less prostration of the vital forces than tartar-emetic ; it is best employed in combination with other emetics, as in the *Compound Powder of Lobelia*, which is much used among Eclectics, and is preferred to any other emetic in the early stage of febrile diseases, and in other instances where a severe succussion of the system is indicated. In spasmodic asthma, hysteria, pertussis, sore-throat, common catarrh, and stricture of the chest common in phthisis, ipecacuanha as an emetic will be found very beneficial. In menorrhagia, a scruple of the powder at bedtime followed by a saline cathartic in the morning, has, in the hands of several practitioners, promptly checked the discharge. In fevers and inflammatory affections, small diaphoretic doses have been highly beneficial. It will likewise act as a nauseant sedative in all local inflammatory diseases, for which purpose it may be extensively used, and will be found extremely valuable in peritonitis, even the worst form occurring in puerperal women, in pneumonia, in which it will assist expectoration, also in hemorrhages, especially uterine hemorrhages. From three to ten grains will produce nausea, which may be continued for any length of time, and which is attended with more or less depression of the pulse, languor, moisture of the skin, and an increased mucus discharge from all the mucous tissues of the system, which renders it very useful in pulmonary and hepatic diseases.

In doses of one quarter of a grain to one-half, it acts as a tonic, improving digestion, increasing the appetite, and is valuable in some forms of dyspepsia. In doses of half a grain to two grains, administered every three or four hours, it produces perspiration, and is beneficial in febrile and inflammatory diseases ; combined with opium, its diaphoretic influence is greatly augmented, as seen in the *Powder of Ipecacuanha and Opium*. In diarrhea and dysentery, both acute and chronic, it has been regarded as a valuable remedy, free vomiting being first induced, after which, two or three grains, with occasionally one-eighth of a grain of sulphate of morphia, may be given every four hours. Combined with podophyllin, it increases the activity of that resinoid, and induces perspiration. An excellent remedy for dysentery is, one grain each of leptandrin and ipecacuanha, and half a grain of podophyllin, to be given every three hours until it operates freely. Sometimes ipecacuanha may be

advantageously combined with other emetic agents, as bloodroot, lobelia, etc., to render emesis more prompt, certain, and effectual. In all cases where this drug cannot be given by the mouth, it may be used in injection, adding two drachms of the powder to one pint of warm water, for an adult,—it will operate kindly and thoroughly as an emetic.

Recently, a liniment of ipecacuanha has been introduced into practice, for the treatment of incipient phthisis, certain rheumatic affections, chronic hydrocephalus, chronic inflammation of the synovial membrane of the knee, and infantile convulsions. As soon as the pustular eruption appears, the symptoms improve more or less rapidly, until a cure is effected. It is made of powdered ipecacuanha, sweet oil, of each, two drachms, lard half an ounce; mix them well together. To be rubbed into the part affected, fifteen or twenty minutes at a time, and to be repeated three or four times daily, covering the part after each rubbing with flannel; in from 24 to 48 hours the eruption appears. It is stated, that an infusion of two drachms of ipecacuanha in a gill of hot water, and strained, will, if drank warm, prove emetic; then if the same quantity of hot water is again added to the residue, strained, and drank cold, it will prove purgative; and the same process repeated the third time, and used cold, becomes a valuable tonic.

Emetia, the active principle of this drug, is so severe and uncertain in its action, that it is not used in medicine. Two grains of it will kill a large dog. A sixteenth of a grain vomited an old man severely.

Off. Prep.—Pulvis Ipecacuanhæ Compositus; Pulvis Ipecacuanhæ et Opii; Tinctura Serpentariæ Composita; Unguentum Ipecacuanhæ; Vinum Ipecacuanhæ.

CEPHALANTHUS OCCIDENTALIS.

Button Bush.

Nat. Ord.—Rubiaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE BARK.

Description.—This plant, sometimes called *Pond Dogwood*, *Globe Flower*, etc., is a handsome shrub growing from three to fifteen feet high, much branched, bark smooth on the branches, rough on the stems. The leaves are opposite, ternate, with red petioles, oval, base acute, apex acuminate, margin sometimes undulate, smooth on both sides, sometimes slightly pubescent, entire, from three to five inches long, and two to three broad. The *flowers* are terminal, forming round balls of a cream-white color, about an inch in diameter, resembling the globular inflorescence of the sycamore (*Platanus Occidentalis*), and are on peduncles about two inches long. *Calyx tube* produced above the ovary, teeth obtuse, persistent. *Corolla* with a somewhat funnel-shaped tube,

with four ovate segments. *Stamens* not much longer than the corolla, with yellow *anthers*. *Style* filiform, much exserted, with a yellow *stigma*. *Capsules* small, crowded, formed of two half bivalve cells, with the valves opposite, each containing one seed.

History.—This plant is found in most parts of the United States and Canada, by the banks of streams and ponds, and in low, wet situations, flowering in July and August, having a peculiar and heavy odor. The wood is light and spongy. The bark is the part used, and possesses much bitterness. Water or alcohol takes up its virtues.

Properties and Uses.—Tonic, febrifuge, aperient, and diuretic. The bark has been used with much success in intermittent and remittent fevers; and the inner bark of the root forms an agreeable bitter, which is often employed in coughs, and as a diuretic in gravel. The plant deserves further investigation. It has never been analyzed, but contains some volatile oil, and much bitter extractive.

CERA ALBA.

White Wax.

CERA FLAVA.

Yellow Wax.

History.—Wax is a peculiar concrete substance, which exists in small quantities in various plants; it is likewise a product of the common bee, *Apis Mellifica* of naturalists, which constructs with it the cells for food and ova. It is a proper secretion of the insect, discharged in the form of scales under the wings of the belly. The wax produced by the bee is the officinal article, of which there are two kinds, *Yellow wax* and *White wax*.

YELLOW WAX is obtained directly from the comb, which, after having been deprived of its honey, is melted in boiling water, strained, again melted and poured into suitable vessels; as the liquid cools the wax concretes, forming the yellow wax of commerce. Our markets are chiefly supplied from the Western States and North Carolina, also from Cuba. It has a grayish-yellow color, a peculiar rather agreeable odor, and a slight peculiar taste. It possesses considerable firmness and tenacity, though rather soft and unctuous to the touch, but no greasiness, has a granular fracture, is smooth and glossy when cut with a knife, does not adhere to the fingers, nor to the teeth when chewed, is softened by a moderate heat, and melts at 142°; its specific gravity is 0.960 to 0.965. Its odor, color, and taste, depend upon some associated principle not forming any of its essential constituents.

WHITE WAX is prepared by exposing thin layers of yellow wax to air, sunshine, and moisture, when it loses its color, nearly all of its odor, and becomes yellowish-white. In factories where this bleaching process is carried on to a considerable extent, the melted wax is made to fall upon a revolving cylinder, kept constantly wet, upon which it concretes, forming thin ribbon-like layers, which are removed from the cylinders, spread upon linen cloths stretched on frames, and exposed to the air, and light; being occasionally watered and turned. To render it perfectly white, this process has to be repeated two or three times, when it is melted and cast into small circular cakes. Chlorine will also decolorize it, but the wax becomes somewhat changed in its character. Pure white wax is white, shining, diaphanous in thin layers, inodorous, insipid, harder and less unctuous to the touch than the yellow, soft and ductile at 95° F., melts at 155° F., and of specific gravity 0.966. At a high temperature it boils, and in close vessels distills over with little alteration; at a red heat its vapor inflames, burning with a dense white brightness. It is insoluble in water, cold alcohol, or ether, but is slightly soluble in boiling alcohol or ether, which deposits it upon cooling. It readily dissolves in fixed and volatile oils, and combines by fusion with fats and resins; boiled with caustic alkaline solutions it is imperfectly saponified. The ultimate constituents of wax are twenty equivalents of carbon, twenty of hydrogen, and one of oxygen, ($C_{20} H_{20} O$). When treated with nitric acid, wax is almost entirely converted into succinic acid. According to Dr. John, wax consists of two proximate principles, Cerin and Myricin, the former constituting about 70 per cent. of the wax, fusible at 143°, soluble in boiling alcohol, partly saponifiable by boiling with caustic potassa, and yielding margaric acid, a little oleic acid, and an unsaponifiable fatty matter called *Cerain*; the latter fusible at 149°, sparingly soluble even in boiling alcohol, and incapable of undergoing saponification. Lewy and Ettling consider cerin, myricin, and cerain to be isomeric, but Hess affirms they are not distinct principles at all, and that wax is essentially a single proximate principle. Mr. B. C. Brodie considers *cerin*, when pure, as an acid having the constitution $C_{54} H_{54} O_4$, and which he terms *Cerotic acid*, which is fusible at 172° F., and on cooling concretes into a very crystalline mass. *Myricin*, when entirely freed from cerotic acid, is saponifiable with difficulty, and from the results of saponification he isolated *Palmitic acid* ($C_{32} H_{32} O_4$) and a peculiar substance, *Melissine* ($C_{60} H_{62} O_4$), which he views as a wax-alcohol, convertible into mellissic acid by the loss of two equivalents of hydrogen, and the gain of two of oxygen.

Both yellow and white wax are liable to adulterations. Resin may be suspected by the fracture being smooth and shining instead of granular, also by its solubility in cold alcohol. Insoluble substances may be discovered and separated by melting and straining the wax. Tallow and suet, by the greasiness imparted, by the softness they communi-

cate to the wax, and its greater fusibility, also by its unpleasant odor when melted. Fatty matters may also be detected by their rendering hot lime-water turbid, when agitated with chips of the suspected wax, and then allowed to rest. Chloroform dissolves stearin and stearic acid completely, but only 25 per cent. of wax; then, if wax, treated with six or eight parts of chloroform, loses more than one-fourth of its weight, it is impure. If the wax contains starch, boil it in water and add tincture of iodine to it, which will produce a blue color. Pereira states that the whiteness of the circular cakes of wax is owing to the presence of spermaceti, and that pure wax is yellowish-white. (*For Myrtle wax see Myrica Cerifera.*)

Properties and Uses.—Wax has but little effect upon the system, though it has been recommended in diarrhea, dysentery, and inflammation of the alimentary mucous membrane combined with olive oil, and the yolk of egg. Its principal employment is in the formation of ointments, cerates, and plasters, of which it forms an ingredient imparting to them due consistence and tenacity.

CEREVISIÆ FERMENTUM.

Yeast.

Preparation.—When an infusion of malt, (barley steeped in water, fermented, and dried in a kiln,) technically called Wort, is subjected to the process of fermentation, a dirty, grayish-brown substance, gradually separates, forming in part a frothy scum, and partly a sediment; this is yeast, or barm.

History.—Yeast is a flocculent, frothy, somewhat viscid semifluid, of a sour, vinous odor, and a bitter taste; it is a very mixed substance, containing water, alcohol, carbonic, acetic and malic acids, potassa, lime, and saccharo-mucilaginous extract. At 60° or in a damp atmosphere, it soon undergoes putrefaction, and exposed to a moderate heat, it becomes dry, hard, and brittle, and may then be preserved for a long time, though with the loss of much of its peculiar power. Yeast is insoluble in alcohol or water. Its most important property is, that when placed in contact with saccharine solutions at a temperature between 50° and 80°, it excites vinous fermentation in them, converting their sugar into carbonic acid and alcohol. This property it owes to its azotized globules or cells, which may be seen in it, when examined with a microscope, appearing as minute transparent vesicles, containing one or more granules. This property is much impaired by drying the yeast, and destroyed by a heat of 212°, the addition of strong alcohol, of several of the acids, or by continued trituration until all the vesicles have burst and lost their

structure. It is also destroyed by boiling water, pyroligneous acid, salts of mercury, essential oils, etc.

Properties and Uses.—Stimulant, tonic, nutritious, antiseptic, and laxative. Used in typhoid fevers by mouth and injection, and in tympanitis by enema. In all malignant ulcerations of the throat and mouth, in diseases where there is a disposition to putridity, in scarlatina, and low stages of fever, with or without the addition of olive oil, which renders it more laxative, it will be found highly beneficial. Externally, in combination with elm bark and charcoal it forms an excellent emollient and antiseptic poultice in sloughing ulcers, stimulating the vessels, removing the tendency to gangrene, and correcting the fetor.

In the recent furunculoid epidemic which existed in this country and Europe, given internally, in conjunction with quinia, yeast was found effectual in the treatment of boils, carbuncles, and felons. The dose of yeast is from half an ounce to an ounce, every two or three hours.

Yeast has been advised in diabetes mellitus in doses of a fluidrachm three or four times a day, taken immediately before meals. It has in some instances proved efficacious, and is supposed to act by decomposing sugar or preventing its abnormal production in the stomach.

Off. Prep.—Cataplasma Fermenti.

CETACEUM.

Spermaceti.

A PECULIAR CONCRETE SUBSTANCE OBTAINED FROM THE SPERMACETI WHALE.

Preparation.—Spermaceti is obtained from the Cachalot or Sperm whale, the *Physeter Macrocephalus* of naturalists, a species of the family *Cetacea*; it is a gregarious animal, inhabiting the Pacific ocean, the waters of the Indian Archipelago, and the Chinese seas. It varies in size, being from fifty to eighty feet in length, with a huge, quadrangular head, from twenty to thirty feet, or more, in circumference, and which constitutes about a third of its whole length. Spermaceti is found in various parts of its body, in small proportions, dissolved in its blubber, but that which is met with in commerce, is obtained from large cavities in the upper part of the head; these are divided into numerous cells, which are filled with a milky, oleaginous solution of spermaceti. From a large whale forty to sixty hundred weight of this fluid may be collected. It is removed from the cavities and boiled to separate the oleaginous matter from the solid substance, and as it cools, the spermaceti crystallizes. The oil is then drained off as much as possible, and the remainder is removed from the spermaceti by powerful pressure. The crude

spermaceti is subsequently purified by fusing and skimming it, then fusing it in weak ley of potassa, and finally by a third fusion at a gentle heat; after which it is solidified in tin molds.

History.—Spermaceti is concrete, crystalline and foliaceous in texture, white, pearly, tasteless, inodorous, friable, soft, and somewhat unctuous to the touch; pulverizable on the addition of a little alcohol or almond-oil, of specific gravity 0.943, fusible at 112° F., combustible, insoluble in water, sparingly soluble in cold alcohol, more soluble in boiling alcohol, ether, and oil of turpentine, but deposited as the liquids cool, and readily soluble in volatile oils, fixed oils, or fused fats. The mineral acids do not affect it, except the sulphuric, which decomposes and dissolves it. Long exposure to the air renders it yellow and rancid, in consequence of its containing a little oil, but it may again be purified by washing it with a warm ley of potassa, or by boiling in alcohol, which deposits the pure spermaceti as it cools. Spermaceti, when deprived of oil by means of an alkali, becomes a pure proximate principle, intermediate between wax and the concrete oils, and presenting all the leading properties of the ordinary article, but less unctuous, rather harder, and fusible only at 120° ; it is then termed *Cetin*, and is soluble in forty parts of boiling alcohol of sp. gr. 0.821. When boiled in a solution of caustic potassa, cetin is partially saponified, forming a brittle soap, composed chiefly of margarate of potassa, oleate of potassa, and a crystalline principle called Ethal, and which soap is not wholly soluble in water. Cetin is a compound of ethal, (hydrated oxide of cetylc,) with ethalic or cetylic acid, ($C_{32} H_{31} O_3 HO$). When melted or dissolved in hot alcohol it crystallizes beautifully; when acted on by nitric acid, it yields first, pimelic acid, ($C_7 H_6 O_4$); which is then oxidized into adipic acid, ($C_{14} H_{12} O_{10}$); which is finally converted into succinic acid, ($C_4 H_2 O_3, HO=S, HO$). Cetin or pure spermaceti consists of 81.66 per cent. of carbon, 12.86 hydrogen, and 5.48 oxygen.

Properties and Uses.—Demulcent, much used among children in domestic practice in coughs, colds, and catarrhal affections, combined with equal parts of loaf sugar, and in irritations of the intestinal mucous membranes. An emulsion may be made by first mixing it with half its weight of olive oil, then with powdered Gum Arabic, and lastly with water gradually added. Spermaceti forms a useful ingredient of several cerates and ointments. Spermaceti enters into the formation of a crayon which is of much value to chemists, druggists, and others, inasmuch as it enables them to write upon clean glass, the contents of bottles, etc., as labels or otherwise. It is made by fusing in a cup four drachms of spermaceti, (or stearine) three drachms of tallow, and two drachms of wax; after which, six drachms of red-lead, and one drachm of potassa are to be stirred into it, keeping the whole mass warm for half an hour, and then pour it into glass tubes the thickness of a lead-pencil. After

rapid cooling, the mass may be screwed up and down in the tube, and cut to the finest point with a-knife.

Off. Prep.—Ceratum Cetacei; Unguentum Aquæ Rosæ; Unguentum Cetacei.

CETRARIA ISLANDICA.

Iceland Moss.

Nat. Ord.—Lichenaceæ. *Sex. Syst.*—Cryptogamia Lichenes.

Description.—Iceland Moss is a perennial, foliaceous plant, from two to four inches high; *thallus* erect, tufted, olive-brown, paler on one side, laciniated, channeled, and dentato-ciliate, the fertile lacinix very broad. *Shields* brown, appressed, flat, with an elevated border.

History.—This lichen is a native of Britain and the northern countries of Europe, particularly Iceland. It is of various colors, being grayish-white, brown, and red in different parts; has a bitter, mucilaginous, somewhat astringent taste; is inodorous, absorbs more than its weight of water when steeped, rendering the water bitter if warmed, is converted into a mucilaginous pulp by long chewing, and when boiled in water the decoction becomes a firm jelly on cooling. The bitter principle, which may be removed by weak alkaline solutions, is called *Cetrarin*, and is used in Italy instead of Cinchona. It may be obtained by boiling the coarsely-powdered moss for half an hour in four times its weight of alcohol of 0.883. When tepid, the solution is to be filtered, and treated with diluted muriatic acid, in the proportion of three drachms to every pound of moss employed. Water, to the amount of four times the volume of the liquid, is then to be added, and the mixture left for a night in a closed matrass. The deposit which forms, is collected on a filter, allowed to drain as much as possible, and submitted to the press. To purify it, break the mass into small pieces, and while still moist, wash it with alcohol or ether, then treat it with two hundred times its weight of boiling alcohol, which dissolves only the cetrarin; as the liquid cools, this is, for the greater part deposited, and the remainder may be obtained by evaporation. One pound of moss will thus yield about 133 grains of cetrarin. It is white, uncrystalline, light, permanent in the air, inodorous, and very bitter, especially in tincture. It is soluble in absolute alcohol, ether, and slightly so in water; alkalies form permanent compounds with it, from which it may be separated by acids with its original properties unchanged. Acids do not unite with it, and its solutions are neutral to test-paper. Concentrated hydrochloric acid converts it into a bright-blue coloring matter. It precipitates the salts of iron, copper, lead, and silver, and has been used in two-grain doses, repeated every two hours, with much success in intermittents. It is supposed to consist of cetraric acid, lichstearic acid, and thallocor.

The most important part of Iceland moss, is its nutritive principle, to which the name of *Lichenin* has been given. It may be obtained by macerating the chopped lichen for twenty-four hours, in eighteen parts of water, containing a 250th of its weight of carbonate of potassa—strain off the bitter solution without pressure, and remove the rest of it from the residuum by maceration with cold water, and simple straining. Boil the residuum in nine parts of water down to six, strain the decoction, and squeeze what is left in the cloth, and then allow the strained liquor to cool. A firm jelly is formed, which cracks and throws out much of the water, and then dries into a hard, black, glassy-like substance. The black coloring matter may be removed by boiling again, straining, cooling, and drying; upon which the lichenin is obtained in thin, transparent, and tough plates of a yellowish color. Cold water renders it gelatinous, boiling water dissolves it, forming a jelly on cooling; alcohol and ether do not affect it. Iodine renders its watery solution blue, and it is converted into sugar by sulphuric acid, and into oxalic acid by nitric acid. It consists of carbon, oxygen, and hydrogen, and in some respects resembles amidin.

Properties and Uses.—Demulcent, tonic, and nutritious. Used as a demulcent in chronic catarrhs, chronic dysentery, and diarrhea, and as a tonic in dyspepsia, convalescence, and exhausting diseases. Boiled with milk it forms an excellent nutritive and tonic in phthisis, and general debility. Its tonic virtues depend upon its cetrarin, which, if removed, renders the lichen merely nutritious.

Off. Prep.—Decoctum Cetrariæ.

CHELIDONIUM MAJUS.

Great Celandine.

Nat. Ord.—Papaveraceæ. *Sex. Syst.*—Polyandria Monogynia.

HERB AND ROOT.

Description.—This plant, sometimes known as *Tetterwort*, is an ever-green perennial, with a *stem* from one to two feet in height, branched, swelled at the joints, leafy, round, smooth. The *leaves* are smooth, spreading, very deeply pinnatifid; *leaflets*, in from two to four pairs, from one and a half to two and a half inches long, and about two-thirds as broad, the terminal one largest, all ovate, cuneately incised or lobed; the lateral ones sometimes dilated at their lower margin, near the base, almost as if auricled; color of all a deep shining green. *Flowers* bright-yellow, umbellate, on long, often hairy stalks. *Umbels* thin, axillary, pedunculate. *Calyx* tawny, often hairy. *Petals* four, entire, yellow, and very fugacious. *Stamens* numerous. *Capsules* long,

torulose, two-valved, one celled. *Seeds* black and shining, each with a whitish deciduous crest.

History.—Celandine is indigenous to Europe, and is extensively naturalized in the United States, growing in waste places, and flowering throughout the summer. The whole plant is very brittle, and exudes when broken, an orange-colored, fetid juice, the taste of which is intensely bitter and acrid, occasioning a sense of burning in the mouth and fauces, which lasts for some time. The root is more powerful than the stems, and is usually preferred. Drying diminishes its activity. It yields its virtues to alcohol or water. Analysis has detected in this plant, a deep-yellow, bitter, resinous substance, an orange-colored, nauseous, and bitter gum-resin, mucilage, albumen, free malic acid, silica, and various salts. More recently a peculiar acid has been detected in it, termed *Chelidonic acid*; an alkaline principle, forming neutral red salts with acids, which are narcotic and poisonous, denominated *Chelerythine*; it is a gray powder, and excites violent sneezing when snuffed into the nostrils; another alkaline principle, bitter, insoluble in water, and forming crystallizable salts, called *Chelidonin*, ($C_{40} H_{20} N_3 O_6$); and lastly a neuter, yellow, crystallizable, bitter principle, termed *Chelidoxanthin*.

Chelerythin may be obtained by forming a strong ethereal tincture of the celandine root; through this pass muriatic acid gas, and dry the precipitated muriate which is insoluble in ether. Then dissolve it in hot water, filter, precipitate by ammonia, dry the precipitate, dissolve it in ether, decolorize by animal charcoal, again precipitate by muriatic acid gas, and decompose the muriate, by ammonia, as before.

Properties and Uses.—Stimulant, acrid, alterative, diuretic, diaphoretic, and purgative. Used internally in decoction or tincture, and externally in poultice or ointment, for scrofula, cutaneous diseases, and piles. Likewise useful in hepatic affections, and is supposed to exert a special influence on the spleen. As a drastic hydragogue it is fully equal to gamboge. The juice when applied to the skin produces inflammation and even vesication, and has long been known as a caustic for the removal of warts, also applied to indolent ulcers, fungous growths, etc., and is useful in removing specks and opacities of the cornea, and in curing ringworms. Dose of the powdered root, from half a drachm to one drachm; of the fresh juice, from thirty to forty drops, in some bland liquid; of the tincture, from one to two drachms; of the aqueous extract, from five to ten grains.

Off. Prep.—Decoctum Chelidonii.

CHELONE GLABRA.

Balmony.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Didynamia Angiospermia.

THE LEAVES.

Description.—This plant, likewise known by the names of *Snakehead*, *Turtlebloom*, *Turtlehead*, *Salt-rheum weed*, etc., is a herbaceous plant, with a perennial root, and erect, somewhat quadrangular, branching stems, from two to four feet high. The *leaves* are opposite, smooth, oblong-lanceolate, acuminate, serrate, short-petioled, and of a dark, shining green above. The *flowers* are large, inodorous, terminal in a dense short spike, somewhat resembling the head of a tortoise; each flower is sessile and furnished with three ovate, acute and entire *bracts*. *Corolla* ringent, white, often tinged with red or purple, ventricose, convex above, five-lobed, two-lipped, the lower lip bearded within. *Calyx* with five unequal imbricated segments, oblong and obtuse. *Stamens* didynamous, with woolly *anthers*; and a short sterile, hairy *filament*. *Ovary* ovate, with a long, exsert *style*, bending downward. *Capsule* oval, two-celled, two-valved, with numerous small, winged seeds, with membranaceous margins.

History.—This valuable medicinal plant is found in the United States in wet situations, and blossoms from July until late in the autumn; the flowers are large and ornamental, varying in color, in the numerous varieties, from pure white to purplish, and resemble in form the head of a snake or turtle. The leaves are exceedingly bitter, but inodorous, and communicate their properties to both water and alcohol. No analysis has been made of them.

Properties and Uses.—Tonic, cathartic, and anthelmintic. Especially valuable in jaundice and hepatic diseases, likewise for the removal of worms, for which it may be used in powder or decoction, internally, and also in injection. Used as a tonic in small doses, in dyspepsia, debility of the digestive organs, and during convalescence from febrile and inflammatory diseases. Recommended in form of ointment as an application to painful and inflamed tumors, irritable and painful ulcers, inflamed breasts, piles, etc. Dose of the powder one drachm; of the tincture, one or two fluidrachms; of the decoction, one or two fluid-ounces.

Off. Prep.—Decoctum Chelonis.

CHENOPODIUM ANTHELMINTICUM.

Wormseed.

Nat. Ord.—Chenopodiaceæ. *Sex. Syst.*—Pentandria Digynia.

SEEDS.

Description.—This plant, known also by the name of *Jerusalem Oak*, has a perennial and branched *root*, with an upright, herbaceous, much branched, deeply-grooved *stem*, rising from two to five feet in height. The *leaves* are alternate or scattered, oblong-lanceolate, deeply sinuate, or dentate, nearly sessile, conspicuously veined, attenuated at both ends, of a yellowish-green color, and studded beneath with small, globular, oily dots. The *flowers* are very numerous, small, of the same color as the leaves, and arranged in long, slender, axillary, or terminal racemes. *Calyx* with five oval, concave segments. *Stamens* opposite the lobes of the calyx, and about as long. *Styles* three, sometimes two, longer than the stamens. *Seed* small, lenticular, covered by the persistent calyx.

History.—Chenopodium is found growing in waste places in almost all parts of the United States, flowering from July to September, and ripening its seeds throughout the autumn, at which time they should be collected. The whole plant has a strong, heavy, disagreeable odor, depending on the presence of a volatile oil, which is most abundant in the seeds. This oil is at first light-yellow in color, but becomes darker by age and exposure to light. The whole plant is occasionally employed, but the seeds only are officinal. When dried, they are of a greenish-yellow or brownish color, irregularly spherical, very small, very light, and have a bitterish, warm, pungent taste, with the peculiar odor of the plant. Wormseed oil is obtained from them by distillation.

Properties and Uses.—Anthelmintic and antispasmodic. It is used in various forms to expel the lumbrici in children, in various forms, as the expressed juice, electuary, or decoction. The dose of the juice, is a tablespoonful repeated night and morning; of the decoction, prepared by boiling an ounce of the fresh plant in a pint of milk, with the addition of some aromatic, a wineglassful; of the electuary, made by thoroughly mixing the pulverized seed in honey or syrup, one or two scruples. But the essential oil, on which the vermifuge properties depend, is the best form, and is more generally employed. Its dose is from four to eight drops mixed with sugar, or in emulsion, to be given morning and evening, for four or five days successively, and then, as with the other forms of administration, it should always be followed by a purgative. Among Eclectics it is used in various combinations. Take of oil of Wormseed and Tansy, of each one ounce, Spirits of Turpentine one ounce and a half, Castor Oil, one pound. Mix. Dose, for a

child, a teaspoonful every hour, until it operates; for an adult, a table-spoonful. The oil has likewise been reputed beneficial in amenorrhea.

The *C. Ambrosoides*, which has been successfully used in chorea, and the *C. Botrys*, which has been used with advantage in catarrh and humoral asthma, as an expectorant, are both indigenous, and though less powerful, possess somewhat similar properties; and, indeed, from the superior powers of the *C. Anthelminticum*, it might possibly be found of more benefit in these affections, than the above.

Off. Prep.—Oleum Chenopodii; Mistura Chenopodii Composita; Mistura Olei Composita.

CHIMAPHILA UMBELLATA. (*Pyrola Umbellata.*)

Pipsissewa.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE WHOLE PLANT.

Description.—This plant is known by various other names, as *Winter-green*, *Prince's Pine*, *Ground-Holly*, etc.; it is a small evergreen, nearly herbaceous, perennial herb, with a creeping, yellowish *rhizoma*, from which are sent several simple, erect, or semi-procumbent *stems*, somewhat angular, marked with the scars of former leaves, and ligneous at their base; they grow from four to eight inches in height. The *leaves* are in two or more irregular whorls, from two to three inches long, and about one-fourth as wide, cuneate-lanceolate, acute at the base, sharply serrate, on short petioles, coriaceous, shining, of a uniform dark-green color, paler below, and not spotted. The *flowers* are corymbose, nodding, of a light-purple color; the *pedicels* with linear-subulate bracts about their middle, one-sixth of an inch long. *Calyx* small, consisting of five roundish, acute teeth or segments, much shorter than the corolla. *Corolla* is composed of five roundish, concave, spreading, cream-colored petals, exhaling a fragrant odor, and tinged at the base with purple. *Stamens* ten, hypogynous; *filaments* sigmoid, the lower half fleshy, triangular, dilated, and slightly pubescent at the edges; the upper half filiform. *Anthers* two-celled, each cell opening by a short, round, tubular orifice, which points downward in the bud, but upward in the flower. *Pollen* white. *Ovary* globular, depressed, furrowed, obscurely five-lobed, with a funnel-shaped cavity at top, and supporting a large, peltate, convex, obscurely five-rayed *stigma*. *Style* short, straight, half as long as the ovary, inversely conical, inserted in the cavity of the ovary, and concealed by the stigma. *Capsule* erect, depressed, five-celled,

five-valved, the partitions from the middle of the valves. *Seeds* numerous, linear, and chaffy.

History.—This beautiful evergreen is a native of the northern latitudes of America, Europe, and Asia, and is found in the United States growing under the shade of woods, and prefers a loose, sandy soil, enriched by decaying leaves. It flowers in June and July. The fresh leaves have a fragrant odor when bruised, but when dried have scarcely any smell, with a pleasantly bitter, astringent and sweetish taste. The whole plant is officinal. Boiling water, or alcohol extracts the active properties. The plant contains a large proportion of bitter extractive, an acrid and volatile principle, resin, gum, lignin, and saline substances.

Properties and Uses.—Diuretic, tonic, alterative, and astringent. The fresh leaves when bruised and applied to the skin, act as vesicants and rubefacients. It is especially useful in scrofula, and chronic rheumatic and nephritic affections. The decoction alone has cured ascites, and has been advantageous in strangury, chronic gonorrhea, and catarrh of the bladder; and as an antilithic it is said to diminish lithic acid in the urine. In dropsy it cannot always be relied on to the exclusion of other more active measures, and is better adapted to cases accompanied with much debility and loss of appetite. In urinary disorders, it may be used as a substitute for the uva ursi, to which it is preferable on account of being less offensive to the stomach. In many cutaneous diseases, it has proved very efficacious. Dose of the decoction, from one to four fluidounces three times a day; of the extract, from ten to twenty grains, three or four times a day; a syrup may be prepared, by macerating four ounces of the finely-bruised leaves, in eight fluidounces of water for thirty-six hours, then subject the whole to percolation till a pint of fluid is obtained, evaporate to half a pint, and add twelve ounces of sugar. Dose, one or two tablespoonfuls.

The *Chimaphila Maculata*, or *Spotted Wintergreen*, may be known from the above by its leaves, which are opposite, or in threes, lanceolate, acuminate, rounded at the base, where they are broader than near the summit, remotely serrate, of a deep olive-green color, and veined with greenish-white. The *C. Umbellata* leaves are broader near the summit, tapering toward the base, of a uniform shining green color, serrated, and not marked with the whitish line along the midvein and veinlets.

The *C. Maculata* is probably possessed of similar powers with the officinal article and may be used as a substitute. An extract of it is reputed to have cured epilepsy.

Off. Prep.—Decoctum Chimaphilæ; Syrupus Stillingiæ Compositus.

CHIOCOCCA RACEMOSA.

Cahinca.

Nat. Ord. — Cinchonaceæ. *Sex. Syst.* — Pentandria Monogynia.

THE BARK OF THE ROOT.

Description.—A subscandent shrub, somewhat resembling the Jasmine, with opposite branches. *Leaves* oval, acuminate, or sometimes obtuse, on a short petiole; they are entire, very smooth, and furnished with two short, acuminate stipules, which are connate at their edges. The *flowers* are in axillary racemes, generally shorter than the leaves; they are usually secund; at first they are white and inodorous, and afterward yellow and fragrant. The *fruit* is a small, white, compressed berry. There are several varieties, differing in the form of the leaves, and more or less scandent character of the shrub.

History.—This plant, sometimes called *Snowberry*, is a native of the West Indies, South America, and also of the sea-coast of Florida. The root, as found in commerce, is of a reddish-brown color, in cylindrical pieces of various sizes and lengths, somewhat contorted, slightly wrinkled longitudinally, with occasional small asperities, and having a thin, brittle, reddish-brown bark externally, and an internal ligneous portion. The cortical part, which contains the medical virtues, is of a bitter, disagreeable taste, somewhat acrid and astringent, and possesses an unpleasant odor. Water or alcohol extracts its active principles.

Properties and Uses.—Tonic, diuretic, purgative, and emetic. In moderate doses it gently excites the circulation, increases the discharge of urine, and produces evacuations from the bowels, but is rather slow in its operation. If warm drinks are used, and the surface of the body kept warm, it will produce diaphoresis, and not purge. In large doses it operates powerfully as an emetic and cathartic. It has been found efficient in dropsy, amenorrhea, rheumatism, syphilis, and osteocopus. In Brazil it is used by the natives as a remedy for the bites of poisonous snakes. It may be used in substance, decoction, tincture, or extract. Dose of the powdered bark of the root, as a diuretic and purgative, from twenty to sixty grains; of the aqueous or spirituous extract, which is preferred, from ten to twenty grains.

CHLOROFORMUM.

Terchloride of Formyle.

CHLOROFORM.

Preparation.—Mix Chlorinated Lime *ten pounds*; first with Water, *three gallons and a half*, and then with Alcohol, *two pints*, in a distillatory

vessel having the capacity of about six gallons. Distil with a brisk heat into a refrigerated receiver, and when the temperature approaches to 176° , withdraw the fire, in order that the distillation may proceed by the heat derived solely from the reaction of the materials. When the distillation slackens, hasten it by a fresh application of heat, and continue to distil until the liquid ceases to come over with a sweet taste. Separate the heavier layer of liquid in the receiver from the lighter by decantation, and, having washed it first with water, and then with a weak solution of carbonate of soda, agitate it thoroughly with powdered chloride of calcium, and distil it off by means of a water-bath, stopping the distillation when eleven-twelfths of the liquid have come over. The residue, together with the light liquid of the first distillation, may be reserved for use in a second operation.

History.—Chloroform was discovered in 1831 by Mr. Samuel Guthrie, of Sackett's Harbor, N. Y., and also by Leibig in Germany, and Soubeiran in France, at about the same time. Guthrie obtained it by distilling a gallon from a mixture of three pounds of chlorinated lime, and two gallons of alcohol, sp. gr. 0.844, and rectifying the product by redistillation, first, from a great excess of chlorinated lime, and afterward from carbonate of potassa. He thus obtained pure chloroform, sp. gr. 1.486, free from alcohol, and rendered pure by washing it with a strong solution of carbonate of potassa.

Chloroform is a limpid, colorless, volatile, neuter liquid, having a bland ethereal odor, and a hot, aromatic, sweetish taste. Litmus paper is not bleached nor reddened by it. It is not inflammable, but renders the flame of an alcohol lamp yellow and fuliginous. Its density is from 1.48 to 1.5, and it boils at 142° . It dissolves readily in ether or alcohol, but is scarcely soluble in water or sulphuric acid; its alcoholic solution when moderately diluted with water forms an aromatic saccharine liquid of a very grateful taste. An abundance of water decomposes a strong alcoholic solution, the chloroform separating and subsiding, and the alcohol uniting with the water. When pure, it has no action on potassium, sulphur, or phosphorus, but is capable of dissolving amber, shell-lac, copal, caoutchouc, gutta percha, iodine, bromine, resins, wax, fats, volatile oils, the organic alkalies, and large proportions of camphor; and as a general solvent, its non-inflammability renders it superior to alcohol or ether. It is composed of three equivalents of chlorine, and one of formyle.

Chloroform has an extensive range of solvent power, and will prove a most valuable auxiliary to the chemist and pharmacist. According to M. Lepage the following is the solvent power of chloroform in relation to various bodies: Mastic, colophony, elemi, tolu, and benzoin, are dissolved in all proportions, forming solutions, some of which might prove useful as varnishes. Copal and caoutchouc also dissolve, but more readily hot than cold. Amber, sandarac, and shell-lac are only

partially dissolved, either with or without heat. Their constituent resins may be thus separated. Olibanum dissolves but slightly, hot or cold. Guaiacum and scammony resin dissolve readily, while jalap resin is insoluble; it merely softens and floats on the surface like pitch. Gamboge and dragon's-blood yield some substance and their fine color to the solvent, and might be advantageously used as varnishes. Fixed oils and fats, dissolve readily, in all proportions. Wax yields 25 per cent. of soluble matter to this solvent. All volatile oils are soluble. Iodine, bromine, phosphorus, and sulphur are soluble, the two last only slightly. Styacin, piperin, naphthalin, cholesterin, and cantharidin are very soluble; picrotoxin, slightly so; paraffin only when hot, separating as the liquid cools; while amygdaline, phloridzin, salicin, digitalin, cytisin, urea, hematin, gluten, and sugar are insoluble. Benzoic and hippuric acids are very soluble, tannic but slightly, and tartaric, citric, oxalic, and gallic acids are insoluble. Quinia, veratria, emetia, narcotina, nicotina, conia, and atropia are easily soluble, strychnia with less readiness, and appears to undergo a change in its morphia condition; brucia is moderately soluble, but morphia and cinchonia are insoluble. Tartar emetic, citrate and lactate of iron, the acetates of soda and potassa, valerianate of zinc, and acetate of lead are all insoluble. Sulphate and muriate of strychnia are soluble, while sulphates of quina, and of morphia, and muriate of morphia, are insoluble. Corrosive sublimate dissolves very readily, but the iodide, bromide, chloride, and ferrocyanuret of potassium, the chloride of sodium, muriate of ammonia and the iodides of mercury and potassium are all insoluble. The iodates, chlorates, nitrates, phosphates, sulphates, chromates, borates, arseniates, and alkaline hyposulphates, are insoluble, as are also nitrate of silver, sulphate of copper, and probably all the metallic oxysalts. This article thus affords a most valuable means of readily separating resin of guaiacum from jalap resin, cinchonia from quinia, and narcotine from morphia. One per cent. of chloroform added to milk, preserved it unchanged for one month, so that it was boiled without coagulating.

When chloroform is impure, owing to the presence of alcohol or ether, its specific gravity is lower. To determine its purity, it has been recommended to let fall a drop of the suspected chloroform in a cool mixture of equal weights of concentrated sulphuric acid and water, the sp. gr. of the mixture being 1.38; good chloroform will sink in it. M. Mialhe recommends for detecting the presence of alcohol, to drop a small quantity of the chloroform in distilled water; it remains transparent at the bottom of the glass, if pure; but the smallest proportion of alcohol gives a milky appearance to the globules. The most injurious impurities are the chlorinated pyrogenous oils, which cause distressing sickness and headache, when inhaled, or even smelt; to detect these, mix the chloroform in quantity, say several ounces, with an equal volume of pure and strong sulphuric acid; if pure, the mixture is not colored, but

if these oils be present, the acid is colored from a yellowish to a reddish brown, according to the amount of impurity present. Another test, is to pour some chloroform on the hand, when pure, it quickly evaporates, and leaves scarcely any odor, but if these oils are present, they are recognized by their peculiar offensive, acrid, and penetrating odor, while the odor of the chloroform has dissipated.

Properties and Uses.—Internally, a sedative narcotic. Has been used successfully in asthma, spasmodic cough, scarlatina, atonic quinsy, hysteria, lead-colic, cancer, neuralgic affections, and in intermittents. It may be administered in doses of from forty to eighty drops, suspended in water by means of gum arabic or yolk of an egg, which may be repeated, if necessary, every hour or two, until some effect is produced on the system. When the pyrogenous oils are present, its internal administration is liable to produce nausea. The solution of camphor in chloroform is an elegant form of administering that medicine. Externally, it has been used as a local application, in form of wash, injection, or gargle, in cancer, senile gangrene, sloughing ulcers, profuse uterine discharges, and foul ulcers of the throat; it lessens pain, corrects fetor, and promotes the separation of diseased parts. It may be used for these purposes, diluted with water, in the proportion of one or two drachms of the chloroform to a pint of water. It has proved successful in dysmenorrhea, being brought into contact with the os uteri by means of a sponge; also in swelled testicle and acute spinal tenderness, neuralgia, rheumatic ophthalmia, and in the form of an ointment to papulous eruptions, in the proportion of a fluidrachm of chloroform to ten drachms of lard. When applied to the sound skin, it is generally used undiluted, by means of lint or soft rags, covered with oiled silk to prevent evaporation. When thus used it should always be pure, as, if it contains absolute alcohol, it acquires caustic properties.

Chloroform is also used by inhalation as an anæsthetic agent, and is considered to possess some advantages over ether, from the smallness of the dose, its more prompt action, its more agreeable effects, its less tenacious odor, its greater cheapness, and the readiness with which it may be exhibited. As an anæsthetic it is principally used in surgery and midwifery, for the purpose of relieving pain, and facilitating labor. The effects usually produced by the inhalation of a full dose of chloroform, are: the rapid production of coma, relaxation of the muscles, slow and often stertorous breathing, incoherent talking or muttering, upturning of the eyes, and total insensibility to pain, from whatever cause. This insensibility is generally produced in one or two minutes, and continues for five or ten minutes; but it may be kept up for several hours, by renewing the inhalation from time to time. Sometimes frothing of the mouth takes place, and occasionally twitches of the face and limbs; at other times, from coughing or other circumstances it may be

a long time before its effect is induced, but which may be obviated by holding it, at first, at a little distance from the nostrils, that it may be mixed with atmospheric air, and gradually approach it. Its immediate effects are followed by a drowsy state, sometimes by quiet sleep, and, generally, no recollection of incidents occurring during the state of insensibility is retained.

Being a relaxing agent as well as remedy for pain, its inhalation has been successful in hiccough, hysteria, asthma, nephritic colic, tetanus, hydrophobia and neuralgia; it has also been employed with success for the reduction of strangulated hernia, and as a hypnotic in delirium tremens and the noisy forms of chronic insanity.

The dose for inhalation is a fluidrachm, or more, which should be repeated in three or four minutes, if the desired effect should fail to be produced. The best inhaler is a handkerchief, closely rolled up, and held in the hand, having a concavity which is to be imbued with the chloroform, and then held to the mouth and nose. The moment insensibility is produced, the inhalation should be suspended, and, if consciousness return too soon, it should be cautiously renewed. Persons affected with epilepsy or organic disease of the heart, should not be placed under its anæsthetic influence. It should never be administered after a full meal, as it may cause vomiting; and an impure article will almost always produce headache, nausea and vomiting.

As chloroform may and has produced unfavorable as well as serious effects, the operator ought always to be provided with a bottle of strong aqua ammonia, and whenever these unpleasant symptoms arise, the patient should be made to inhale it from another handkerchief imbued with it in the same manner as named for chloroform, and be either restored to sensibility or not, as the case may require. The usual remedies when the effects of the chloroform inhalation proceed too far, are the horizontal posture, cold air fanned upon the face, cold water to the head and face, frictions and heat to the body and extremities, and ammonia to the nostrils; and if these fail, artificial respiration must be resorted to. To obviate these alarming effects it has been proposed to employ an agent composed of one-third pure chloroform and nearly absolute alcohol two-thirds, under the names of Tincture of Chloroform, or strong Chloric Ether. This is considered safer than chloroform, and more agreeable than ether. The stimulating properties may possibly obviate the depressing influence of the chloroform; and ether has sometimes been given in connection with chloroform, with a view to the same effect. A chloroform liniment has been made of oil of almonds two fluidounces, chloroform two and a half fluidrachms; mix together accurately. Pieces of flannel are to be soaked with this liniment, and applied to the painful part in cases of nervous headache, neuralgia, rheumatic, hepatic, nephritic, uterine, or intestinal pains, lead-colic, etc. By adding double the quantity of oil, it may be used

for vaginal injections, which may be retained by a plug of cotton, in cases of dysmenorrhea, uterine neuralgia, or other painful affections of the uterus, bladder, or rectum.

The fumes from burning the common Puff Ball, *Lycoperdon Proteus*, are said to be anæsthetic, but not equal to ether or chloroform. It appears to possess a volatile narcotic principle, which is not taken up by alcohol, water, or strong alkaline solution.

CHONDRUS CRISPUS.

Irish Moss.

Nat. Ord.—Algaeæ. *Sex. Syst.*—Cryptogamia Algæ.

Description.—Irish Moss, or *Carrageen*, as it is frequently called, has a root-disk throwing up tufts of many flat, nerveless, slender, cartilaginous *fronds*, from two to twelve inches in length, subcylindrical at the base, but immediately becoming flat, generally dilating from the base as they ascend, until they become three or four lines wide, and then dividing repeatedly and dichotomously, each division spreading and becoming narrower than the preceding one, and taking place at shorter and shorter intervals; the summits are bifid, the segments linear, wedge-shaped, varying greatly in length, rounded or acute, straight or curved, and often twisted in such a manner as to give the curled appearance denoted in the specific name. *Fructification* roundish or roundish-oval, subhemispherical. *Capsules* imbedded in the disk of the frond, prominent on one side, and producing a concavity on the other, containing a mass of minute, roundish, red seeds. *Substance* cartilaginous, in some varieties approaching to horny, flexible and tough. *Color* a deep purple-brown, often tinged with purplish-red, and paler at the summit, becoming greenish, and at length white in decay.

History.—This plant grows upon rocks and stones on the coasts of Europe, especially on the southern and western coasts of Ireland; said also to be a native of the United States. When collected, it is washed and dried. It is of a yellowish-white color when dried, translucent, of a feeble odor, and nearly tasteless. Boiling water dissolves it, forming a jelly on cooling. Cold water does not dissolve it, but swells it up. It contains starch, a large proportion of pectin or vegetable jelly, which Pereira proposes to call *Carrageenin*, supposing it to be a distinct proximate principle, also compounds of sulphur, chlorine and bromine, and some oxalate of lime, etc. Carrageenin may be known from gum, by its watery solution not affording a precipitate with alcohol; from starch, by not becoming blue with tincture of iodine; and from pectin by giving no precipitate with acetate of lead, and no mucic acid by the action of nitric acid.

Properties and Uses.—Used in the form of decoction, with water or milk, as a nutriment, and as a demulcent in chronic pectoral affections, dysentery, diarrhea, and disorders of the kidneys and bladder. The decoction may be prepared by boiling half an ounce of the moss in a pint and a half of water, down to half a pint. Sugar and lemon-juice may be added to improve the flavor. It may be boiled in milk, when a more nutritious preparation is required.

CHRYSANthemum LEUCANTHEMUM.

Whiteweed.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE LEAVES AND FLOWERS.

Description.—Chrysanthemum Leucanthemum, or the *Leucanthemum Vulgare* of Lamark, sometimes known as *Ox-eye Daisy*, is a perennial herb, with an erect, branching, furrowed stem, growing from one to two feet high; the leaves are comparatively few and small, alternate, amplexicaul, lanceolate, serrate, cut-pinnatifid at base; the lower ones petiolate, with deep and irregular teeth; the upper ones small and subulate, and those of the middle sessile, deeply cut at base, with remote teeth above. Heads large, terminal, solitary. Disk yellow. Rays numerous and white.

History.—This plant was introduced into this country from Europe, and is a very troublesome weed to farmers, in nearly every section. It generally grows from one to two feet high, and bears white flowers in June and July. The leaves are odorous and somewhat acid; the flowers are bitterish; they impart their virtues to water.

Properties and Uses.—Tonic, diuretic, and antispasmodic. Large doses emetic. Used as a tonic instead of chamomile flowers, and has been found serviceable in hooping-cough, asthma, and nervous excitability. Very beneficial externally and internally in leucorrhea; and its internal use has been highly recommended in colliquative perspiration. Externally, it has been used as a local application to wounds, ulcers, scald-head, and some other cutaneous diseases. Dose of the decoction, from two to four ounces, two or three times a day. Said to destroy, or drive away fleas.

Off. Prep.—Decoctum Chrysanthemi.

It much does a harm or cure.

CICHORIUM INTYBUS.

Succory.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE ROOT.

Description.—*Succory*, *Chicory*, or *Wild Succory*, is a perennial plant, having a spindle-shaped, fleshy, whitish, and milky root. The stem is solid, round, furrowed, hispid, very tough, growing two or three feet high. The radical leaves are spreading, above a span long, numerous, runcinate, toothed, roughish; *cauline leaves*, smaller, sessile, less lobed, the uppermost cordate, acuminate, entire. *Flowers* large, one or two inches in diameter, axillary, in pairs, sessile, placed rather remote on the long rather naked branches, and of a beautiful bright-blue color. *Corollas* flat, five-toothed. *Involucre* roughish. *Anthers* and *stigma* blue.

History.—*Succory* is a native of Europe, but cultivated in this country, where it grows in fields, and in roads along the fences, in neighborhoods which have been long settled; it bears large, compound, beautiful blue flowers, which appear in July and August. The root has a bitter taste, without any peculiar flavor, and imparts its virtues to water.

Properties and Uses.—Tonic, diuretic, and laxative. The decoction, used freely, is said to have proved serviceable in hepatic congestion, jaundice, and other visceral obstructions in the early stages; also in hemorrhage, gout, cutaneous eruptions, and even hectic fever and other febrile diseases.

The usual form of administration is in decoction, an ounce or two of the root in a pint of water. When young and tender, the leaves are sometimes eaten as salad; the root, when dried and roasted is much used as a substitute for coffee among the French, which it resembles in taste but without the aroma.

The *Cichorium Endivia*, or *Garden Endive*, is said, by some French physicians, to be a remedy for jaundice.

CIMICIFUGA RACEMOSA. (*Macrotys Racemosa*.)

Black Cohosh.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Di-Pentagynia.

THE ROOT.

Description.—This plant, likewise variously known as *Ratilleroot*, *Black Snakeroot*, *Squawroot*, etc., is a tall stately plant, having a

large blackish, perennial *root*, with numerous long fibers, and a simple, herbaceous, smooth, furrowed *stem*, from four to eight feet high. The *leaves* are few, alternate, one nearly radical, large, decompose, and tripinnate; upper one, bipinnate. The *leaflets* are ovate, oblong, sessile, opposite, three to seven, incised and toothed. The *flowers* are fetid, small, white, in a long terminal raceme, with oftentimes one or more shorter ones at base; this raceme is at first bent, but gradually becomes erect; the flowers are supported on short pedicels, with a small subulate bract. *Calyx* white, with four rounded sepals. *Petals* small and shorter than the sepals, and cleft at their apex. *Stamens* very numerous, with yellow anthers. *Pistil* consists of an oval germ, with a lateral, sessile stigma. The *fruit* or *capsule* is ovoid, dry, with one cell, containing numerous flat, smooth *seeds*, which are packed horizontally in two rows.

History.—Black Cohosh is a native of the United States, growing in shady and rocky woods, rich grounds, and on the sides of hills, from Maine to Florida, flowering in June and July. The root is the part generally employed in medicine, though probably the seeds will be found as active; the root should be gathered early in the autumn and dried in the shade. It consists of a thick, irregularly-bent or contorted body or caudex, from one-third of an inch to an inch in diameter, often several inches in length, furnished with many slender radicles, and rendered extremely rough and jagged in appearance by the remains of the stems of successive years, which, to the length of an inch or more, are frequently attached to the root. The color is externally, dark-brown, almost black; internally, a yellowish-white; the odor is feeble and disagreeable, and the taste bitter, and somewhat astringent, leaving a slight sense of acrimony. The root partially yields its virtues to boiling water, but wholly to alcohol or ether.

The root contains a resin, to which the name, *Macrotin* or *Cimicifugin*, has been applied, likewise gum, starch, sugar, wax, fatty matter, tannic and gallic acids, a black coloring matter, a green coloring matter, lignin, and salts of potassa, lime, magnesia, and iron.

Properties and Uses.—This is a very active, powerful, and useful remedy, and appears to fulfil a great number of indications. It possesses an undoubted influence over the nervous system, and has been successfully used in chorea, periodical convulsions, epilepsy, nervous excitability, asthma, pertussis, delirium tremens, and many spasmodic affections. In chorea, it has been administered in teaspoonful doses of the powdered root, to be repeated three times a day; I, however, prefer the hydro-alcoholic extract, which I have used successfully, both alone, and in conjunction with the extract of scullcap. In phthisis pulmonalis, cough, acute rheumatism, neuralgia, scrofula, phlegmasia dolens, amenorrhea, dysmenorrhea, leucorrhea, and other uterine affections, the

saturated tincture is the best mode of exhibition, and which exerts a therapeutic influence not to be obtained from the cimicifugin. Its tonic and antiperiodic virtues are well marked in remittent and intermittent fevers, and I have found it very useful in other febrile and exanthematous diseases, especially among children, where there exists a strong tendency to cerebral difficulty. It uniformly lessens the force and frequency of the pulse, soothes pain, allays irritability, and lessens the disposition to cerebral irritation and congestion. In febrile diseases especially, it frequently produces diaphoresis and diuresis. In doses of one drachm of the tincture, repeated every hour, it has effected thorough cures of ophthalmitis conjunctiva, without the aid of any local application. As a partus accelerator, it may be substituted for ergot; half a drachm of the powdered root, may be given in warm water, every fifteen or twenty minutes, until the expulsive action of the uterus is induced, and which it seldom fails to bring on speedily and powerfully; or half a drachm of a saturated tincture of the root may be given in the same manner. After labor, it will be found effectual in allaying the general excitement of the nervous system, and relieving after-pains. In large doses it produces vertigo, impaired vision, nausea, vomiting, and a reduction of the circulation, but no alarming narcotic effects. I have known three drops of the saturated tincture given every hour, for twenty hours, to produce symptoms in every way simulating those of delirium tremens. Green tea is said to counteract its narcotic influences.

Dr. C. H. Cleveland, of Waterbury, Vt., recommends the saturated tincture of the root, as a valuable embrocation in all cases where a stimulant, tonic, anodyne, and alterative combined, is required, as—in all cases of inflammation of the nerves,—*tic-doulooureux*, periodic cephalic pain, inflammation of the spine, ovarian inflammation, spasm of the broad ligaments, rheumatism, *crick in the back or side*, inflammation of the eyes, old ulcers, etc. If a more active preparation is desired, he adds tincture of grains of paradise in proper quantity; and if a more powerful anodyne would be useful, he adds a solution of sulphate of morphia.

Cimicifuga exerts a tonic influence over both the serous and mucous tissues of the system, and will be found a superior remedy in the majority of chronic diseases. In all cases where acidity of stomach is present, this must first be removed, or some mild alkaline preparation be administered in conjunction with the remedy, before any beneficial change will ensue. Dose of the powder, from a scruple to a drachm, three times a day; of the saturated tincture, from five to sixty drops; of the decoction, from two to four ounces. The saturated tincture of this article was recommended by me in acute rheumatism, in the New York Philosophical Journal, as early as in the year 1844; to be given in doses of ten drops every two hours, gradually increasing to sixty drops, or until its action on the brain is observed, which action must be kept up

for several days; it almost always removes the disease permanently, especially if it is a first attack.

Off. Prep.—Cimicifugin; Decoctum Cimicifugæ; Enema Cimicifugæ Composita; Extractum Cimicifugæ Hydro-Alcoholicum; Extractum Cimicifugæ Fluidum; Tinctura Colchici Composita; Tinctura Cimicifugæ; Tinctura Cimicifugæ Composita.

CIMICIFUGIN. (*Macrotin.*)

THE RESINOID PRINCIPLE OF THE ROOT OF CIMICIFUGA RACEMOSA.

Preparation.—Cimicifugin is prepared in a manner similar to that for obtaining Podophyllin, or Leptandrin. The saturated tincture of the root, is diluted with its bulk of water, the alcohol is distilled off, and the resinoid precipitates to the bottom of the vessel. Or it may be precipitated by alum, acids, etc., but is not so active when thus prepared.

History.—It is a dark-brown substance, sometimes yellow, being lighter-colored after pulverization, of a faint, narcotic odor, and a slightly bitter, feebly nauseous taste, soluble in alcohol. This valuable and useful remedy I have used successfully in medicine since 1835, and had the honor of calling the attention of practitioners to it in 1844, and again in the Western Medical Reformer, of 1846; but it was not received into general use among practitioners until its preparation on a large scale by our indefatigable pharmacist, W. S. Merrell, and it is now ranked among the standard and most important Eclectic agents. As I have dropped the name of *Macrotys* in this work, and adopted the one more universally used, I have also taken the liberty of substituting the name *Cimicifugin* for that of *Macrotin*, considering it more correct, and fully as euphonious.

Properties and Uses.—Tonic, alterative, nervine, antiperiodic, with an especial affinity for the uterus. It does not possess the narcotic properties of the root; which, however, is preserved in the hydro-alcoholic extract, or the ethereal extract. Used in intermittent fever, periodic diseases, leucorrhea, menorrhagia, dysmenorrhea, amenorrhea, sterility, rheumatism, scrofula, and prolapsus uteri not accompanied with an inflammatory condition of that organ or its ligaments. It has also been used with success in gleet, gonorrhea, dyspepsia, etc., and the tincture has been found an excellent application in chronic ophthalmia.

Cimicifugin may be advantageously combined with any of the uterine tonics and alteratives, as aletrin, caulophyllin, senecin, asclepidin, etc. in diseases of the uterus; it forms a useful combination, with dioscorein, for flatulency and to remove the tendency to bilious colic; and made

into a pill with equal parts of dioscorein and aqueous extract of Cramp bark, it is highly beneficial in flatulency, bilious colic, cramps of pregnant women, painful dysmenorrhea, spasmodic affections, borborygmi, and in cholera morbus to remove the cramps. As a parturient, it is inferior to the caulophyllin. Dose, from one to six grains three times a day.—In the following, *Cimicifuga* and *Cimicifugin*, have been substituted for *Macrotys* and *Macrotin*.

The late Prof. T. V. Morrow says of this article :

For several months past I have used the cimicifugin very extensively, in the treatment of a numerous class of female diseases, for the successful treatment of which I had for many years previous been in the habit of depending mainly on the *Cimicifuga Racemosa*, either in the form of infusion, decoction, or tincture. My confidence in the value of the *Cimicifuga Racemosa*, I am free to confess, has been such as to induce me to use perhaps a larger quantity of this medicine, for the last sixteen years, than any practitioner in the United States, giving it a more extended range of application in the treatment of disease, and relying with more confidence on its ultimate efficiency, than any of my medical friends. My experience in the use of this article, during the period named, has been mostly confined to cases of leucorrhœa, menorrhagia, prolapsus uteri, threatened miscarriage, dysmenorrhea, and barrenness, or sterility, in all of which cases I have obtained the most satisfactory results from the *Cimicifuga*; but deeming the *Cimicifugin* a more convenient form of the medicine for practical use, and believing it to contain the virtues of the article from which it is obtained, I have accordingly used it in similar cases, with results thus far which justify the conclusion that it will be found a satisfactory substitute.

My experience in the use of the *Cimicifugin* has demonstrated to my mind that there is a slight difference in the *modus operandi* of this form of the medicine, when compared with the usual forms in which the *Cimicifuga Racemosa* has been used. That difference principally consists in the increased liability of the latter to produce a heavy, dull, and aching sensation in the forehead, in connection with a feeling of dizziness, while the former appears to manifest a greater tendency to produce aching, and somewhat painful sensations in the joints and limbs generally. I have usually given the *Cimicifugin* in the form of pills, prepared by adding a small quantity of pulverized Castile soap, enough to make the mass properly adhesive, and forming it into pills of the ordinary size, and giving one every three hours during the day, in all the various cases above mentioned, whenever they have come under my care, since I commenced its use. In nearly all these cases, it has proved singularly beneficial, thus affording the gratifying evidence that it will soon become one of the most popular and valuable articles of the *Materia Medica*.

Another Professor, in speaking of Cimicifugin, remarks:

"This medicine is, in its effects, essentially the same as the Cimicifuga. It is particularly useful in chronic rheumatic affections, and in female diseases. In leucorrhea and dysmenorrhea, as well as menorrhagia, it is invaluable. It should be used, in order to get its best effects, to the extent of producing its specific constitutional symptoms, *i. e.* a peculiar dizziness, fullness and dull aching of the head, and more or less aching in the joints. This effect should be produced every day (slightly) during the treatment, until the disease is removed. By this treatment, and the use of hip-baths, leucorrhea will often be cured in a week or ten days, without any other remedy."

The analogous diseases, gleet and gonorrheas, are greatly benefited, if not speedily cured by it, either alone or in combination with other appropriate remedies.

The Cimicifugin is also a most valuable medicine, especially as an adjunct of other remedies, in all pulmonary, rheumatic and dyspeptic affections, where there is a want of tone in the nervous system.

"It is also a very useful agent in the treatment of small-pox, in which it should be given during the whole course of the disease. It seems to divest it of its malignant character. I have never lost a case of small-pox where this medicine was used thoroughly from the beginning; and during the winter of 1849 and 1850, I treated from fifty to one hundred cases, some of which were of the most severe confluent kind. The dose is from one-fourth to one grain, to be given once in three or four hours until the proper symptoms of the medicine appear."

Off. Prep.—Pilulæ Leonuri Compositæ; Pilulæ Polygoni Compositæ.

CINCHONA.

Peruvian Bark.

Nat. Ord.—Cinchonaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE BARK.

Description.—*Cinchona Calisaya* according to Weddell, is a lofty tree, with a trunk two or more feet in diameter, and a summit usually rising above the other trees of the forest. The *leaves* are oblong, or lanceolate-obovate, petiolate, obtuse, acute or slightly attenuated at the base, softish, from three to six inches long, and one or two in breadth, above smooth, of a velvety aspect and obscurely green, beneath smooth, and of a pale emerald hue, with scrobiculi at the axils of the veins, but scarcely visible on the upper surface. The *stipules* are about as long as the petioles, or somewhat longer, oblong, very obtuse, and very smooth. The *flowers* are in ovate or subcorymbose panicles. The *calyx* is pubes-

cent, with a cup-shaped limb, and short triangular teeth; the *corolla* is rose-colored, with a cylindrical tube about one-third of an inch long, and a lacinate limb fringed at the edges; the *stamina* are concealed in the tube, and have anthers more than twice as long as the filaments. The *fruit* is an ovate capsule scarcely as long as the flower, inclosing elliptical lanceolate seeds, the margin of which is irregularly toothed, so as to have a fimbriated appearance. This tree grows in forests upon the Andes several thousand feet above the ocean, also in the hottest valleys of Bolivia, and in the south of Peru. From it the Calisaya or Yellow Bark is obtained, but, as stated by Weddell, who met with considerable difficulty before he could obtain a sight of the tree in its full vigor, it is rapidly disappearing, on account of the careless manner in which the bark-collectors attend to it. The discovery of this species has settled the inquiry concerning the true source of the Calisaya bark.

The *Cinchona Boliviana*, discovered and named by Weddell, inhabits Peru and Bolivia, but is found further to the north than the *C. Calisaya*; and in the northern parts of Bolivia the two species frequently grow together. The bark of the *C. Boliviana* is frequently mixed with the Calisaya, and it is not easy to distinguish them; this, however, is unimportant, as the two barks do not essentially differ in their properties.

CINCHONA CONDAMINEA is a tree attaining the height of eighteen feet, with a stem a foot in diameter. The *branches* are opposite, the lower horizontal, the upper rising at their extremities; the bark of the trunk is ash-gray, with clefts or fissures, and yields when wounded a bitter astringent juice; that of the small branches is greenish, smooth, glossy and easily separable from the wood. The leaves are quite smooth at all periods of growth, usually ovate-lanceolate, sometimes narrower and only lanceolate, occasionally ovate; about four inches long and less than two broad, rather thin, not shining on the upper surface, or but little so in some specimens; mostly with a pit or scrobicula at the axils of the veins beneath, when full-grown; this scrobicula is either naked or ciliated, but the young leaves are indistinctly or not at all scrobiculate. *Petioles* smooth, about one-fourth the length of the leaves; *stipules* oblong, obtuse, membranous, smooth. The *flowers* are in corymbose panicles, pedunculated, and forming a loose, large, very downy thyrsus in the axils of the upper leaves. *Tube* of the *calyx* tomentose, limb shortly urceolate, five-toothed, pubescent, not shining; the teeth acute, roundish, triangular. *Tube* of the *corolla* slender, about four times as long as that of the calyx, tomentose; limb very shaggy within. This tree inhabits the mountains near Loxa, and several other places in Peru, always in micaceous schist, and occupies a zone of 1800 feet, growing at elevations between 5700 and 7500 feet. It furnishes the Crown, or Loxa bark.

CINCHONA MICRANTHA is a large tree attaining the height of forty feet, with quadrangular branches, smooth, except among the inflorescence.

The *leaves* are from four to twelve inches long, and from two to six broad, oblong, obtuse, or hardly acute, rather membranous, very large, quite smooth on both sides, shining on the upper surface, and distinctly pitted at the axils of veins beneath, and either smooth or hairy there; those near the base of the inflorescence, shorter and blunter. The *flowers* are smaller than those of any other species, except *C. Lancifolia*, and are in terminal, loose, leafless panicles. *Calyx* tomentose, with a short five-toothed limb, scarcely changed in the fruit. *Corolla* tomentose, woolly inside the limb. This tree grows on the high, cool, and wooded mountains of Peru, and furnishes the pale bark, or the gray or silver bark of British commerce, frequently called Huanuco bark.

CINCHONA LANCIFOLIA has quadrangular branches, except when very young, when they are covered with short spreading hairs. *Leaves* oblong-lanceolate, very acute at both ends, revolute at the edge; somewhat coriaceous, not shining, smooth above, thinly beset with hairs on the veins beneath, not scrobiculate. *Peduncles* axillary, hairy, trifid, shorter than the leaves, and not forming a panicle or thyrsus; the divisions cymose and about five-flowered. *Tube of calyx* tomentose; limb smooth, campanulate, three to five-toothed, teeth revolute at the apex. *Corolla* hairy, the smallest in the genus, with a tube about three times as long as the cup of the calyx; the limb on each side smooth, surmounted by an enlarged calyx. This tree is a native of New Grenada, and the bark which it affords was supposed by Lindley to be the *best pale bark*; but according to Pereira it is the *spongy Carthagena bark* of Guibort, a new spurious yellow bark. Mutis, the discoverer of this species, termed it *Orange bark*.

CINCHONA CORDIFOLIA is a spreading tree, fifteen or twenty feet high, with a single, erect, round stem, covered with a smooth bark, of a brownish-gray color. Its branches are smooth and quadrangular. *Leaves* roundish, obtuse at both ends, especially at base, or roundish-oblong and tapering to the base, strongly-veined, thin, smooth above, downy beneath, and hairy at the veins and axils when young, becoming nearly smooth when old; never pitted. *Panicle* contracted, thyrsoid, leafy at base, or formed of corymbose peduncles, axillary to the upper leaves, with the ramifications tomentose. *Calyx* tomentose, with a large, smooth, campanulate, five-toothed cup, the lobes of which become quadrate and cuspidate; the tube subglobose when it first begins to enlarge after the fall of the corolla, afterward becoming longer. *Corolla* tomentose, with a thick tube whose diameter is equal to the length of the shaggy lobes. This tree inhabits the mountains about Santa Fé de Bogota in New Grenada, at an elevation of from 5000 to 9500 feet. It was at one time supposed to afford the officinal yellow bark. The *Quina Amarilla*, or Yellow bark of Santa Fé is supposed to be derived from this tree, and which has been ascertained by Bergen and Guibort, to be identical with *Hard Carthagena Bark*.

CINCHONA MAGNIFOLIA, described by Mutis as the *C. Oblongifolia*, has oblong leaves, sometimes narrowed toward the base, obtuse, often a foot long, coriaceous, strongly-ribbed, shining on both sides, perfectly free from hairiness, except when very young, unless on the principal veins, and at their axils. Flowers in a large terminal, leafless thyrsus, with erect branches, merely downy, not woolly. Calyx-tube clothed with a very short, dense tomentum; limb pubescent, smooth at the edges, with oval, obtuse, imbricating teeth. Corolla externally tomentose, with a tube hardly four times as long as that of the calyx; limb quite smooth inside, except at the edges, which are tomentose. Fruit smooth, narrower at the base than at the apex, slightly ribbed. This tree is found in abundance on the mountains Panatahuas, in low land near torrents, in situations fully exposed to the sun, but badly ventilated. It was formerly supposed to be the source of the officinal red bark, which, however, is incorrect. The bark afforded by the tree is red, but it is the red *Carthagena bark*, a worthless variety, and identical with the *Quina Nova* or *New bark* of European commerce. Weddell has transferred this tree to his new genus *Cascarilla*, which differs from the true Cinchona or Peruvian bark trees, in not yielding any cinchonia or quinia.

The first three species above described, are regarded as officinal by the Pharmacopeias of the United States and Great Britain; the others have contributed more or less to furnish the bark of commerce, but are not viewed as officinal. There are many other species which yield barks possessing febrifuge properties, and which we will merely name, as:—the *C. Nitida*, found in cold situations, in lofty mountains of the Andes, and furnishing a bark, which, though unknown as a distinct variety in commerce, is yet very highly esteemed in Huanuco, Huamalies, etc., bringing a very high price.—The *C. Lucumæfolia*, growing near Loxa in Peru, and probably contributing to the Loxa barks.—*C. Lanceolata*, inhabiting cold elevated situations in the Andes; its bark is yellow, and resembles the calisaya in its flavor.—*C. Ovalifolia*, a shrub from seven to ten feet high, and growing in the province of Cuenca; its bark is of an inferior quality, and according to Pereira, it is the *White cinchona* of Mutis.—*C. Ovata*, growing in close, badly ventilated woods, in the hottest parts at the foot of the Andes, about ten leagues from Huanuco. The bark from this tree varies in character according to its situation, the finer kinds passing for Calisaya bark, and in some sections it is employed to adulterate the true Calisaya. Weddell states that this species is widely diffused in Peru and Bolivia. Ruiz calls its bark *Cascarillo Pallido* or *Pale bark*, and states that an extract is prepared from it at Panao.—*C. Pubescens* inhabits the lower parts of the Andes in the provinces of Loxa, Jaen, Panatahuas, etc., and is likewise found in New Grenada. It is a large tree with purple flowers, and leaves violet-tinted. It yields an inferior bark, which, it is said, is employed to adulterate the better kinds. Reichel considers it the *Huamalies bark* of commerce, and

Weddell states it to be the *Cusco bark* of French commerce.—*C. Hirsuta*, occurring in high and cold situations on the Andes, yields a good bark, formerly called *Quina Delgadilla* or *Delgada*, but which is seldom collected at present.—*C. Glandulifera*, a shrub of about twelve feet, with very fragrant blossoms, and found on the high mountains N. W. of Huanuco. It yields an excellent bark, not met with in commerce, called by the inhabitants *Cascarillo Negrillo* from its blackish epidermis.—*C. Acutifolia*, growing in the Peruvian Andes, and yielding a worthless bark, called according to Ruiz and Pavon, *Cascarilla de hoja aguda*; Weddell has placed this species in his new genus *Cascarilla*. *C. Macrocarpa*, a shrub about eight feet high, found in the provinces of Loxa and Cuenca, and in New Grenada. Its bark is called *Quina Blanca*, or White Bark, and is not much esteemed; Weddell has transferred it to his *Cascarilla*.—*C. Villosa*, growing at Jaen of Loxa.—*C. Rotundifolia*, of Loxa.—*C. Oblongifolia*, of St. Jaen de Loxa, of which three nothing is known respecting their barks.—*C. Caduciflora*, growing near the town of Jaen de Bracomoris; the trunk yields considerable resin, and the bark is called *Cascarilla bora*. *C. Scrobiculata*, growing in the Peruvian provinces of Jaen, Cuzco, and Carabaya; the bark of the young branches has been placed with the pale or gray barks in quality; that of the larger branches and stem probably among the red.—*C. Stenocarpa*, occurring in the mountains of Loxa, placed among the *Cascarillas* by Weddell.—*C. Cava*, found in Quito, and placed by Weddell in the genus *Cascarilla*. To these may be added, *C. Amygdalifolia*, *C. Purpurascens*, *C. Australis*, *C. Chomeliana*, *C. Asperifolia*, *C. Carabayensis*, all of which were discovered and described by Weddell; and as imperfectly known species, *C. Dichotoma*, *C. Macrocalyx*, *C. Crassifolia*, *C. Pelaba*, and *C. Muzonensis*.

History.—Peruvian Bark was introduced into Europe in 1640, but the first account of the plant was given by Dr. Arrott in 1737. About the same time La Condamine, and in 1740 the elder Jussieu obtained specimens from near Loxa. In 1772, Mutis, a Spanish botanist, having official charge of the Cinchona forests, became a leading authority among Botanists, but, unfortunately, he committed many errors, and misled them, causing much difficulty in determining the correct botanical history of the trees which yielded the Peruvian bark. Since then Ruiz, Pavon, Humboldt, and Bonpland, with many others, have furnished more or less accurate information relative to this subject. The latest investigations have been made by Weddell, whose valuable researches have settled the hitherto vexatious question relative to the Calisaya bark, he having discovered its true source.

The name, Cinchona, was bestowed upon the plant by Linnæus, in compliment to the Countess of Cinchon, the wife of the then Viceroy of Peru, who was cured of an ague by it, and brought some of it to

Europe in 1640. The history of its discovery is involved in much obscurity. The genuine Cinchonas are found on the Andes, principally in Columbia, Bolivia, and Peru, or from 11° N. to 20° S. latitude. They are found in the greatest abundance west of the Andes, and at elevations varying from 1200 to 10,000 feet; how far they extend eastward has not been thoroughly ascertained. The best kinds are found in dry situations, at a temperature about 68° F., and situated at elevations between 6000 and 8000 feet. Much confusion has resulted from the too great importance attached to the study of particular species, and to the attempt to divide the genus into numerous species, from very slight differences. It is now well known that the same tree may vary in its foliage, as well as in the chemical character of its bark, depending on peculiarities of situation or growth, severity or mildness of climate, degree of mountainous elevation, nature of the soil, and various other circumstances. Humboldt considers all those trees with hairy and woolly blossoms, as the true Cinchonas, possessing febrifuge virtues, and Weddell has transferred all those with smooth corollas into his new genus, *Cascarilla*.

The gathering of the bark is performed by persons called *Cascarilleros*, who, in order to be properly qualified for the business, must be well acquainted with the trees, the proper period for collection, and other circumstances necessary for obtaining good bark. They usually commence operations in May, when the dry season sets in, more generally cutting down the tree, and then stripping off the bark; sometimes they decorticate the tree while standing. The former plan is viewed as the best, as the stump pushes up shoots which eventually become fit for decortication, while, in the latter instance, deprived of its bark, the whole plant perishes. After the bark has been removed, it must be speedily dried in the sun, or else it becomes impaired. In the process of drying, the bark rolls itself up, becoming quilled, and is then sent to the coast for exportation, and is packed in chests, called *seroons*, formed of hides and coarse cloth, each package weighing from fifty to one hundred and fifty pounds, and usually containing several sorts in the same seroon.

The Cinchona forests occupy regions which never can be applied to agricultural purposes, and which extend over thirty degrees of latitude, thus almost precluding the idea of even their remote extinction. The bitterness of the tree is not confined to its bark, but exists in its leaves, flowers, and root-bark. In the leaves it is associated with an acid, and in the flowers with a delightful fragrance which diffuses itself throughout the air in the vicinity of the trees.

Cinchona is divided into three varieties, the *Pale*, the *Yellow*, and the *Red*—the extra-official or inferior kinds are termed *Carthagena Barks*. This division is founded on the physical characters of the bark, which appear to be very distinct in the official varieties above alluded to, and

which is, probably, the best division that could be made in the present state of our knowledge.

The PALE BARK is so termed, on account of the color of its powder, which is pale or grayish-fawn, and of a deeper hue in the inferior sorts. It is moderately bitter and somewhat astringent, with a feeble, agreeably aromatic odor. The bark as received in this country is in cylindrical pieces, varying from a few inches to two feet in length, singly or doubly quilled, from two lines to an inch in diameter, and from half a line, to three or four lines in thickness. The best kinds are about the size of a goosequill. They have a rough exterior, with circular or longitudinal fibers, and a grayish, dull-brown, or grayish-fawn color, owing to adhering lichens. The interior or internal surface is smooth in the finer kinds, but rough and somewhat ligneous in the coarser; its color is a brownish-orange, sometimes inclining to red, sometimes to yellow, and in the poorer specimens of a dusky hue. The fracture of the bark is generally smooth, with some short filaments on the internal part only; it is more fibrous in the coarser barks. The pale bark is collected, probably, from *C. Condaminea* and *C. Micrantha*, and its appearance indicates it to have been taken from the smaller branches. *All the pale barks contain a much greater quantity of cinchonia than quinia*; and solution of sulphate of soda is not precipitated with their infusion. In this country it is but little employed, in consequence of the little quinia which it yields. There are several varieties of pale bark, differing more or less in their properties, as the Crown or Loxa, the Gray, Silver, Lima, or Huanuco, the Ash or Jaen, and the White Loxa, among which the first named is esteemed the finest.

YELLOW BARK, is the term applied to those barks of this color only, which possess the valuable chemical properties of the drug, and which are known by the name of *Calisaya*; they are arranged into two divisions, the quilled and the flat. The *quilled Calisaya* is in pieces varying from a few inches to two feet in length, from a quarter of an inch to three inches in diameter, and of equally variable thickness. The epidermis is of a brownish color, diversified or concealed by whitish or yellowish lichens, rough, being much traversed by longitudinal wrinkles and transverse fissures, and is generally easily separable from the proper bark. It yields a dark-red, tasteless, and inactive powder, and should, therefore, always be removed before the bark is powdered. When the epidermis is removed, the bark is one or two lines in thickness, compact, of a short-fibrous texture, and when broken presents shining points, apparently the termination of small fibers running longitudinally, which, examined by the microscope, are found, when freed from a salmon-colored powder that surrounds them, to be yellow and transparent. They readily separate, when the bark is powdered, in the form of spiculæ, which, like those of cowhage, insinuate themselves into the skin, and

produce a disagreeable itching and irritation. The color of the bark is brownish-yellow, with a tinge of orange, the taste less astringent than that of the pale bark, but much more bitter. The external portion of the proper bark is more powerful in medicinal virtue than the internal; probably from the longer exposure of the latter to the action of the air and moisture; the odor is faint, but resembles that of the pale varieties, when the bark is boiled in water.

The *Flat Calisaya* bark is obtained from the large branches and trunk; it is in pieces of various lengths, either quite flat, or but slightly curved, generally stripped of their epidermis, on which account they are preferable to the quilled pieces. Their inner surface is like that of the quilled pieces; the outer is irregular, marked with confluent longitudinal furrows and ridges, and somewhat darker-colored than the inner, being of a brownish-fawn, frequently diversified with darker stains. The bark is of uniform fracture throughout, generally thicker than the quilled, more fibrous in its texture, less compact, less bitter, and possessed of less medicinal power. The best yellow bark is very bitter, with a slight astringency, of a brownish-yellow color with a tinge of orange, which is still brighter in the powder, and *contains a much greater quantity of quinia than cinchonia*; the salts of quinia and lime are so abundant in its composition, that a strong infusion of it instantly precipitates a solution of sulphate of soda. This variety of bark is principally derived from the *Cinchona Calisaya*, and a portion from the *C. Boliviana*, both of which species have been recently described by Weddell. It is produced exclusively in Bolivia, and in the southern part of the province of Carabaya, and is imported principally from the ports on the Pacific Ocean.

The RED BARK, always comes to this country in quilled or flat pieces, and packed in chests. The quills are from two lines to an inch and a quarter in diameter, from one-third of a line to two lines thick, and from two to twelve inches or more in length. The flat pieces, which are the more common of the two, are seldom absolutely flat, but are somewhat curved; they are from two inches to two feet in length, from one to five inches in breadth, and from three to nine lines in thickness. They are generally covered with the epidermis, which is rough, wrinkled longitudinally, often warty, little fissured, of a reddish-brown color, with a grayish efflorescence in the hollows from adhering lichens. Beneath the epidermis is a dark-red, brittle, and compact layer, possessing some bitterness and astringency, but much less so than the fibrous and woody interior parts, which have a lively brownish-red color, and the odor of other good barks. Its powder is of a reddish-brown color, and *contains considerable quantities both of quinia and of cinchonia*. Its decoction is of a turbid salmon color. The species of *Cinchona* which yields the red bark is unknown, although supposed to be taken from the same

trees which furnish the pale bark. Weddell observed that the pale barks are almost constantly nothing else than the young barks of the same trees which yield the yellow and red barks. The red and yellow barks are preferred in medicine to the pale variety.

The *CARTHAGENA BARKS* are all those barks brought from the northern Atlantic ports of South America, and known as *Carthagena*, *Maracaybo*, and *Santa Martha barks*. They all have a soft, whitish, micaceous epidermis, which may be readily removed by the nail, and some contain small quantities of quinia and cinchonia; there are several varieties of them, as,—1. *Hard-yellow Carthagena Bark*, the *China flava dura* of Von Bergen, supposed to be derived from the *Cinchona Cordifolia*, and imported from Carthagena. It is obtained generally in quilled pieces, or in sections of cylinders, and often in flat pieces. It may be known from the true yellow bark, by having scarcely any transverse fissures, and by presenting uniformly a velvety, grayish-white, or pale-yellowish-white, glistening epidermis, except in places where it has been rubbed, and which color is essential and not dependent upon lichens, as with the true bark. Its fracture is abrupt and splintery. Its taste is bitter and nauseous, but not so bitter as in the officinal article.

2. *Fibrous, or Woody-yellow Carthagena Bark*, the *China flava fibrosa* of Von Bergen; its botanical source is not positively known. It generally occurs in flat or slightly-curved pieces, sometimes in quills. Its epidermis is generally wanting in part or altogether, but when present, resembles in consistence that of the former variety. Its color is rather brighter than in the preceding kind, it is less compact, its fracture is more fibrous, causing it to exhibit long splinters when broken transversely, and often to hang together by connecting fibers when broken longitudinally, and its taste is more feebly bitter and slowly developed.

The powder of these Yellow barks is of a yellowish-cinnamon color, with less of the reddish tint than the *calisaya*, for which it is not unfrequently sold. It may be detected by its feeble bitterness, but with still more certainty by a solution of sulphate of soda, which causes no precipitate with its infusion.

3. The *Red Carthagena Bark*, the *Quinquina Nova* or *New Bark* of Guibort, and the *Red Bark* of Santa Fé, of Mutis; said to be derived from the *Cinchona Magnifolia*. It is widely different from every other true cinchona bark, and has no resemblance whatever to the true officinal red bark; and is seldom seen, except as an adulteration of this latter article. When large the bark is flat or open, when small and cylindrical, quilled; its epidermis is whitish, micaceous, thin, uniform, with a very few transverse rents, apparently caused by drying. The bark, stripped of its epidermis, is of a pale reddish-brown color, becoming deeper externally where it is exposed to the air, thick, spongy, of a flat

astringent taste with scarcely any bitterness ; its fracture is foliaceous externally, and short-fibrous internally ; its powder is fibrous and red, and said to contain neither quinia nor cinchonia.

4. The *Orange Carthagena Bark*, the Spongy Carthagena Bark of Guibourt, and the Orange Cinchona of Santa Fé, of Mutis, derived from the Cinchona Lancifolia. It occurs in quills, flat and semicylindrical pieces of various sizes, covered with a velvety, pale grayish-white, micaceous surface, marked with longitudinal and sometimes transverse fissures. The substance of the bark is orange-colored, fibrous externally, light, spongy under the teeth, feebly bitter, and of but little value. Its powder is of a beautiful orange color. This bark is seldom met with in commerce.

5. Guibourt has described a *Brown Carthagena Bark*, which is thick, of an orange-brown color when freshly cut, and a chocolate color on its inner surface, very bitter and disagreeable, but sometimes spongy and nearly tasteless ; its epidermis is soft, velvety, white, and micaceous. Its origin is unknown, and it is worthless.

Several barks have occasionally been found in commerce, possessing none of the physical characteristics of the officinal varieties, and which are termed *False Barks*. Among them are, the *Caribæan Bark* from the *Exostemma Caribæa* ; the *St. Lucia Bark* from the *Exostemma Floribunda*, and the *Pitaya Bark* of uncertain origin. This last only is known in this country ; it is in quills, the bark being hard, compact, thin, and with a short, rough fracture. The outer surface is of a dull grayish-olive color, with irregular lighter or whitish spots ; the internal surface is deep-brown or blackish ; the fresh fracture, brownish-red or orange. It has a very bitter taste, and is inodorous. It contains a new crystallizable alkaline, tasteless salt, forming bitter salts with the acids, termed *Pitania*. The bark has cured ague in the quantity of half an ounce. Neither quinia nor cinchonia exist in the false barks.

The Cinchona barks have often been analysed, and with various results. Dr. Westring was the first who attempted the discovery of an active, febrifuge principle in the bark ; subsequently Seguin, Deschamps, Vauquelin, Duncan, Gomez, Lambert, and others pursued a similar undertaking, but the honor of first making the great discovery of the alkaloid principles termed *Cinchonia* and *Quinia* was reserved to Pelletier and Caventou, who announced it in the year 1820. According to their analysis, the several barks contain, as follows :—

Pale Loxa Bark contains a fatty matter, a red coloring matter, very slightly soluble, identical with the cinchonic red of Reuss, a yellow coloring matter, soluble in water and alcohol, and capable of being precipitated by the subacetate of lead, tannin, gum, starch, lignin, kinate of lime, *kinate of cinchonia*, and a minute quantity of kinate of quinia.

Yellow Calisaya Bark contains the same as the above, with the exception of gum, and a larger proportion of *kinate of quinia*, and much less *kinate of cinchonia*.

Red Bark also contains the same as the Pale Loxa, with the exception of gum, and a large proportion both of *kinate of quinia*, and of *kinate of cinchonia*.

The only appreciable difference therefore in the officinal barks, is in the proportions they contain of quinia and cinchonia. The odor of the bark depends upon a thick, bitterish acid, *volatile oil*, which is present in minute quantity.

The *fatty matter* existing in the bark is of a greenish color when obtained from the pale bark, and orange-yellow from the yellow. Boiling alcohol dissolves it, but deposits a portion of it on cooling; ether dissolves it readily; alkalies form soaps with it, and in water it is insoluble. The *red coloring matter* is a reddish-brown, amorphous substance, insipid, inodorous, soluble in alcohol, alkaline solutions, or their carbonates, and insoluble in ether or water, though slightly soluble in the latter at the boiling point. Its solubility in water is augmented by the addition of acids. It precipitates tartar emetic, but not gelatin; if treated with a cold solution of potassa or soda, or by ammonia, lime, or baryta with heat, and precipitated, from the solution thus formed, by acids, it is converted into a species of tannin, and forms an insoluble compound with gelatin. Subacetate of lead precipitates it. The red bark contains the greatest proportion of it, the pale the least. The *yellow coloring matter* has little taste, is soluble in water, alcohol, and ether, does not precipitate gelatin nor tartar-emetic, and is itself precipitated by subacetate of lead.

The *Tannin* or *Soluble red coloring matter* of Pelletier and Caventou, has a brownish-red color, and austere taste, is soluble in water or alcohol, combines with metallic oxides, like the tannin in catechu, produces precipitates with the salts of iron, which are deep-green with the pale bark, blackish-brown with the yellow, and reddish-brown with the red. With gelatin and tartar-emetic it forms white precipitates, and readily absorbs the atmospheric oxygen, becoming red and insoluble. Although considered to possess all the properties of tannic acid, yet it must differ materially from that found in galls, which forms insoluble compounds with quinia and cinchonia.

Kinic acid, likewise called Quinic, or Cinchonic acid, may be obtained by evaporating the infusion of bark to a solid consistence, and then treating the solid extract with alcohol, which gives a residue consisting of mucilage with *kinate of lime*, which is insoluble in alcohol. Dissolve this residue in water, and evaporate with a moderate heat, and crystals of the *kinate* will be deposited, which may be purified by a second solution and crystallization. The salt thus obtained, being dissolved in

water, is decomposed by means of oxalic acid, which precipitates the lime, and leaves the *kinic acid* in solution. This may be procured in the crystalline state by spontaneous evaporation, though as usually prepared, it is in the form of a thick, syrupy liquid. The crystals are transparent, colorless, acid, and readily soluble in alcohol, and in water. The kinates of cinchonia and quinia may be obtained either by the direct combination of their constituents, or by the mutual decomposition of the sulphates of those alkaloids and the kinate of lime. *Kinate of cinchonia* crystallizes with difficulty, is very soluble in water, soluble in alcohol, and has a bitter and astringent taste. *Kinate of quinia* crystallizes in opaque or translucent crusts of a mammillated form; it is soluble in water, less so in rectified alcohol, and has a very bitter taste.

The most important constituents of Cinchona bark are the *Cinchonia* and *Quinia*, the mode of preparing which, with their history, etc., will be found under their appropriate heads.

The different kinds of Cinchona bark, yield their active constituents to boiling water, rectified spirit, proof spirit, and diluted acids. In preparing a decoction or infusion of bark, the addition of muriatic or sulphuric acid in small quantity would be advantageous in retaining the alkaloids in the solution; because, without the infusion is thus acidulated, the cinchonic-red unites with the alkaloids, producing compounds not readily soluble in hot water, and still less soluble when cold, so that as the infusion cools, the active constituents are thrown partly down insoluble, forming part of a deposit of a reddish powder. Proof spirit, from its ready solubility of the principal constituents, is a much better solvent than water, and should be used in preparing officinal tinctures. Percolation exhausts more of the alkaloid principles than maceration; and the extract prepared from the tincture is vastly superior to that obtained from the aqueous decoction.

Water acidulated with muriatic, sulphuric, nitric, acetic, or tartaric acid, but especially with the first-named acid, effects exhaustion completely, either by decoction or by percolation. Diluted alkalies, as well as their carbonates, do not act on the alkaloids, but decompose their natural salts, leaving the bases undissolved, and dissolving cinchonic-red, cinchonic-yellow, tannin and fatty matter.

In infusions of the true barks, ammonia and potassa precipitate chiefly the alkaloids; bichloride of mercury, and neutral chloride of platinum produce insoluble double salts of the alkaloids; astringent solutions produce insoluble tannates of the alkaloids; tartar emetic, sulphate of iron, and gelatin, owing to the presence of tannin, precipitate tannates of antimony, iron, and of gelatin, and sometimes throw down cinchonic-red also; oxalate of ammonia, and in strong infusions sulphate of soda, throw down oxalate or sulphate of lime; and iodide of potassium causes precipitates of a complex nature.

In order to determine the genuineness of Peruvian bark, or to detect adulterations, many druggists judge of the color of the powder, which is the form in which they more usually obtain it, its pure, strong, aromatic, evanescent bitterness, and the peculiarity and strength of its aroma; but this method is extremely fallacious. The best methods of testing it are by chemical reactions, among which ammonia, iodide of potassium, infusion of galls, and solution of isinglass are the best. Ammonia causes a more or less abundant precipitate with the true bark, soluble in an excess of the reagent, but throws down no precipitate with the infusions of the Carthagena and of the false barks. Iodide of potassium causes sooner or later a yellowish-white or yellowish-red precipitate with the true barks, but not with the others. Infusion of galls causes no precipitate, except with the true barks; hence, no bark can be considered good which does not afford a precipitate with the infusion of this substance. Gelatin causes a precipitate only with the Carthagena barks. It must be remembered that all the substances which precipitate the infusion of bark, do not by any means, necessarily impair its virtues, as it contains several inert ingredients which form insoluble compounds with bodies that do not disturb its active principles.

In preparing a decoction of Cinchona, it should be boiled for ten minutes in a covered vessel, and strained while hot; long boiling, or the action of atmospheric oxygen, or both combined materially impair its virtues. By acidulating the water employed, say a fluidrachm of muriatic or sulphuric acid to a pint of the water, we will be able to extract all the virtues of the bark. Tannic, gallic, oxalic and tartaric acids, or substances containing them should be excluded from the decoction, as they form insoluble, or nearly insoluble salts with the alkaline principles of the bark. The alkalies, alkaline earths, and salifiable bases generally should also be excluded, because, uniting with the Kinic acid, they precipitate the quinia and cinchonina.

The following mode of estimating the value of bark by the quantity of alkaline matter it contains, we copy from a communication of M. Tilloy of Dijon, published in the 13th vol. of the *Journ. de Pharmacie*, p. 530. "Take an ounce of the bark coarsely powdered, introduce it into about 12 ounces of alcohol of 30° B. (sp. gr. 0.8748), expose the mixture for half an hour to a temperature of from 105° to 120° F., draw off the alcohol, add a fresh portion, and act as before; unite the liquors, and throw into them a sufficient quantity of acetate or subacetate of lead to precipitate the coloring matter and kinic acid, then allow the insoluble matter to subside, and filter. Add to the filtered liquor a few drops of sulphuric acid to separate the excess of acetate of lead, filter, and distil off the alcohol. There remains an acetate or sulphate of quinia, according to the quantity of sulphuric acid employed, together with a fatty matter which will adhere to the vessel. Decant the liquor, and add ammonia, which will instantaneously precipitate the quinia. Too much

ammonia will retain it in solution ; but in this case a few drops of sulphuric acid will cause it to precipitate. The quinia washed with warm water, and then treated with sulphuric acid, water, and a little animal charcoal, yields very white sulphate of quinia. I have thus obtained in six hours nine grains of the sulphate from an ounce of bark [576 grains French], which is a large proportion when allowances are made for the loss during the process."

The Edinburgh Pharmacopœia gives the following mode of testing the value of yellow bark: "A filtered decoction of one hundred grains of the powder in two fluidounces of distilled water, gives, with a fluidounce of concentrated solution of carbonate of soda, a precipitate, which, when heated in the fluid becomes a fused mass, weighing when cold two grains, or more, and easily soluble in solution of oxalic acid."

Properties and Uses.—Cinchona bark is tonic, antiperiodic, slightly astringent, and topically antiseptic. When received into the stomach it generally causes a sense of heat, which often diffuses itself gradually over the whole trunk; occasionally it causes gastric and intestinal irritation, and even nausea and vomiting, particularly if the stomach is in an irritable or inflamed condition. The circulation finally becomes influenced by it, as manifested in the increased frequency of the pulse, with a slight excitement of all the functions of the system, especially when given in large doses. In many persons its action upon the nervous system is accompanied with a sense of tension, fullness, or slight pain in the head, tinnitus aurium or singing in the ears, and partial deafness. It is valuable in functional derangements of the stomach, improving digestion, and invigorating the nervous and muscular systems in diseases of general debility, and in convalescence from exhausting diseases. As a tonic, it will be found of advantage in the latter stages of typhus gravior, also in measles, small-pox, malignant scarlatina, during the absence of fever or inflammation; likewise in carbuncle, gangrenous erysipelas, and in all cases in which the system is exhausted under large purulent discharges, and where there is a tendency to recovery, supporting the powers of the constitution until all abnormal action is removed. It may likewise be used in all chronic diseases attended with debility, as in scrofula, dropsy, passive hemorrhages, certain forms of dyspepsia, obstinate cutaneous affections, amenorrhea, chorea, and hysteria. Its use is contra-indicated where any local irritation or inflammation is present; profuse sweats during sleep may be considered one indication for its employment.

Cinchona bark, however, exhibits its most important therapeutical powers, as an antiperiodic, and in the consequent influence it exerts in almost invariably curing remittent and intermittent fevers, and the generality of diseases which are accompanied by symptoms of marked periodicity, as neuralgia, hemicrania, epilepsy, diarrhea and dysentery when epidemic, etc. Its use should in most cases be preceded by a mild

laxative, after the action of which the powder may be given in doses of from ten to sixty grains, and repeated according to circumstances, every one, two or four hours, until one or two ounces have been taken during the periods of intermission, and continue thus until a cure is effected, or the remedy is found insufficient for the cure of the disease. In the use of the barks, to obtain their antiperiödic influence, the red and yellow are considered superior to the pale, and of which the red is preferred. The pale bark is preferable as a tonic, being less apt to offend the stomach, or irritate the bowels. Quinia, or its salts, especially the sulphate, is usually employed as a tonic and antiperiodic in place of the bark itself, but there have been many instances in which the bark in powder has succeeded in effecting a cure, when its alkaloidal salts failed; the cause of this is not well understood. In such cases, when the powder from its bulk or otherwise, offends the stomach, the infusion, decoction, tincture, or extract may be administered. Sometimes bark or its preparations occasions purging, which may be obviated by small portions of opium or laudanum.

Externally, a poultice of the bark has been found an excellent application to felons, fetid and gangrenous ulcers, etc., also as an injection with opium, when the stomach rejects it; and quilted between two pieces of muslin or flannel, and made into jackets, it has been of utility in obstinate intermittents, to be worn next the skin. Dose of Cinchona as an antiperiodic, from half a drachm to a drachm; as a tonic, from ten to sixty grains; of the infusion or decoction two fluidounces, to be repeated two or three times a day; of the extract from five to thirty grains.

Off. Prep.—Cinchonia; Decoctum Cinchonæ; Extractum Cinchonæ; Extractum Cinchonæ Fluidum; Infusum Cinchonæ; Quiniæ Sulphas; Tinctura Cinchonæ; Vinum Cinchonæ Compositum.

CINCHONIA.

ONE OF THE ALKALOIDS OF CINCHONA BARK.

Preparation.—Several processes have been employed for the preparation of Cinchonia. One of the simplest is the following: Powdered pale bark is submitted to the action of sulphuric or muriatic acid very much diluted, and the solution thus obtained is precipitated by an excess of lime. The precipitate is collected on a filter, washed with water, and treated with boiling alcohol. The alcoholic solution is filtered while hot, and deposits the cinchonia when it cools. A further quantity is obtained by evaporation. If not perfectly white, it may be freed from color by first converting it into a sulphate with dilute sulphuric acid, then treating the solution with animal charcoal, filtering, precipitating by an alkali, and redissolving by alcohol in the manner already men-

tioned. It may also be obtained from the mother-waters of sulphate of quinia, by diluting them with water, precipitating with ammonia, collecting the precipitate on a filter, washing and drying it, and then dissolving it in boiling alcohol, which deposits the cinchonina in a crystalline form upon cooling. It may be still further purified by a second solution and crystallization.

History.—When pure, cinchonina is a white, crystalline substance, soluble in 2,500 parts of boiling water, almost insoluble in cold water, insoluble in chloroform, very soluble in boiling alcohol, which deposits a portion in the crystalline state upon cooling, and slightly soluble in ether and the fixed and volatile oils. Its bitter taste, at first not very obvious in consequence of its difficult solubility, is developed after a short time by the solution of a minute portion in the saliva. Its alcoholic, ethereal, and oleaginous solutions are very bitter. Its alkaline character is very decided, as it neutralizes the strongest acids, forming with them saline compounds. Of the salts of cinchonina, the sulphate, nitrate, muriate, phosphate, and acetate are soluble in water. The neutral tartrate, oxalate, and gallate are insoluble in cold water, but may be dissolved in hot water, in alcohol, or in an excess of acid.

Heat fuses and decomposes it, disengaging ammonia. Sulphuric acid in excess, aided by heat, renders crystallizable cinchonina amorphous. Exposed to the air it slowly absorbs carbonic acid, and acquires the property of effervescing slightly with acids, but does not become decomposed. When dissolved in water in the saline state, it may be known from any other vegetable alkali, by a reddish, somewhat orange color, produced by the addition first of a solution of chlorine, and then of ammonia to the solution. Perchloride of gold precipitates it of a sulphur-yellow. Cinchonina consists of 1 equivalent of nitrogen, 20 of carbon, 12 of hydrogen, and 1 of oxygen, ($N C_{20} H_{12} O$). When distilled with potassa it yields quinoléin.

The *sulphate* or *disulphate* of *cinchonina* may be prepared by heating cinchonina with a little water, adding dilute sulphuric acid gradually till the alkali is dissolved, then boiling with animal charcoal previously washed with muriatic acid, filtering the solution while hot, and setting it aside to crystallize. By alternate evaporation and crystallization, the whole of the sulphate may be obtained from the solution. It is a white, very bitter salt, crystallizing in flexible, somewhat shining, four-sided, flattened prisms, terminated by an inclined face, and generally collected in fasciculi. It is soluble in fifty-four parts of water at $60^{\circ} F.$, and in a smaller quantity of boiling water. It consists of 100 parts of cinchonina, and 13.021 of sulphuric acid.

Properties and Uses.—Pure cinchonina, the acetate and disulphate are prescribed in medicine; their properties are said to be similar to quinia; which see. Dose, from one to four grains, three times a day.

CINNAMOMUM ZEYLANICUM. (*Laurus Cinnamomum*.)

Cinnamon.

Nat. Ord.—Lauraceæ. *Sex. Syst.*—Enneandria Monogynia.

THE BARK.

Description.—*Cinnamomum Zeylanicum* is a tree growing from twenty to thirty feet high, with a trunk from a foot to a foot and a half in diameter, and covered with a thick, scabrous bark. The *branches* are numerous, smooth, strong, horizontal, declining, and somewhat quadrangular; and the *young shoots* are speckled with dark-green, and light-orange colors. The *leaves* are for the most part opposite, coriaceous, entire, ovate or ovate-oblong, tapering into an obtuse point, three-nerved, with the lateral nerves vanishing as they approach the point, reticulated on the under side, smooth, the upper leaves being the smallest. *Panicles* terminal or axillary, stalked. The *flowers* are small, white, hoary, and silky; segments oblong, deciduous in the middle. The *fruit* is an oval berry, which adheres to the receptacle similar to the acorn, it is larger than the black currant, and when ripe has a bluish-brown surface diversified with numerous white spots.

Cinnamomum Aromaticum is a tree similar to the above, with angular branches, and petioles covered with broken downiness. The *leaves* also resemble the above, but differ in being oblong-lanceolate and pointed, and in having a very fine down on their under-surface which may be seen by the aid of the microscope. The flowers are in narrow, silky panicles.

History.—The *C. Zeylanicum* is a native of Ceylon, the Malabar coast, Sumatra, Borneo, etc. The bark of the root has the odor of cinnamon with the pungency of camphor, which latter is obtained from it by distillation. The leaves have a hot taste, and when rubbed a spicy odor resembling cloves, owing to an oil which they yield on distillation. The flowers have a disagreeable odor, said to be similar to that exhaled from freshly-sawn bones. The tree throws out no fragrance beyond its immediate sphere. The bark furnishes the cinnamon of commerce. It is usually collected from trees about nine years old. The peeling of the shoots and branches commences in May, and lasts until the latter part of September, and merely consists in slitting the bark longitudinally, cutting it across at certain intervals, and then turning it back. The epidermis is then removed by scraping, and the bark, as it dries, assumes the form of quills, the smaller of which are introduced into the larger ones. The drying is always performed in the shade first, and finished in the sun. The best bark comes from Ceylon, which is in the form of rolls about half an inch in diameter, and thirty to forty inches long, and composed of many quills within each other. They have a

light yellowish-brown color, are thin, smooth, and break readily with a splintery fracture, being easily pulverizable. They possess a rich, pure, peculiar odor, and a sweetish, aromatic, slightly astringent, pungent and peculiar taste; are easily pulverized, and yield their virtues to water, but more readily to alcohol or spirit. They yield, when distilled, a small quantity of essential oil, of an agreeable flavor. The inferior barks are browner, thicker, less splintery, and of a less agreeable flavor. The Cinnamon brought to this country is imported from England. It contains an essential oil, tannin, mucilage, a coloring matter, cinnamic acid, resin, and lignin. The tannin is of the nature of catechu-tannin, as it gives a dark-green precipitate with the salts of iron.

The *C. Aromaticum* is a native of China, and furnishes the cassia of this country, which is in fact, a mixture of a variety of different qualities of cinnamon. It is usually found in our markets in single tubes of various sizes, from the eighth of an inch to an inch in diameter, of a redder or darker color than the best Ceylon, also thicker, rougher, denser, and breaks with a shorter fracture. It has a stronger, more pungent and astringent, but less agreeable taste and odor. It is the kind usually kept in the shops, and forms a good substitute for the Ceylon cinnamon in forming tinctures, etc., into which cinnamon enters as an ingredient.

There are several other species of cinnamon, as the *C. Nidum*, *C. Tamala*, *C. Loureirii*, *C. Culilawan*, etc., but they are not recognized as officinal.

Cinnamon is often adulterated with the poorer sorts, and likewise with the bark after having been deprived of its oil. These adulterations must be detected by the taste and odor of the article.

Properties and Uses.—Stimulant tonic, stomachic, carminative, and astringent; also reputed emmenagogue, and capable of diminishing the secretion of milk. The tincture of the bark is useful in uterine hemorrhage and menorrhagia, given in drachm doses in sweetened water, and repeated every five, ten, or twenty minutes, or as may be required. Cinnamon is generally used to correct the effects, or improve the flavor of other drugs, and is one of the best additions to cinchona bark for correcting the nausea or vomiting sometimes occasioned by that drug. Internally, it is very useful in diarrhea, colic and cramp of the stomach, flatulency, and to allay nausea and vomiting. Dose of the powder, from five to twenty grains; of the tincture, from ten to sixty drops. (*See Oil of Cinnamon.*)

Off. Prep.—Acidum Sulphuricum Aromaticum; Aqua Cinnamomi; Oleum Cinnamomi; Tinctura Cinnamomi; Tinctura Cardamomi Composita; Tinctura Catechu; Tinctura Guaiaci Aromatica; Tinctura Olei Cinnamomum; Vinum Cinchonæ Compositum.

CIRSIIUM ARVENSE. (*Cnicus Arvensis*.)

Canada Thistle.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE ROOT.

Description.—This plant, called in England *Cursed Thistle*, has a perennial, creeping, very long root, extremely tenacious of life, with a stem three or four feet in height, having a branching panicle at top. The leaves are alternate, oblong or lanceolate, sessile, smooth, or slightly woolly beneath, sinuate-pinnatifid, and prickly margined. Heads rather small and numerous, imperfectly diœcious; flowers, rose-purple; involucre round or ovate, with minute spines, scales close pressed, ovate-lanceolate.

History.—Canada Thistle grows in various sections of the United States, in cultivated fields and pastures, roadsides and waste places, flowering from June to August. It is an extremely troublesome plant to the farmer, requiring his utmost vigilance to extirpate it from his fields. The involucre is the only part of the plant that can be handled with safety. The root is the part employed, which yields its properties to water.

Properties and Uses.—Tonic and astringent. Used principally in diarrhea and dysentery, boiled with milk; some recommend the addition of dried codfish skin to the decoction. Also, used as a local application to some cutaneous diseases, ulcers and leucorrhœa.

Off. Prep.—Decoctum Cirsium.

CISSAMPELOS PAREIRA.

Pareira Brava.

Nat. Ord.—Menispermaceæ. *Sex. Syst.*—Dioecia Monadelphia.

THE ROOT.

Description.—Pareira Brava, also termed *Velvet-Leaf*, *Ice-Vine*, is a climbing shrub, attaining a great size and covering even the tallest trees with its foliage. The root is branching and woody, with numerous slender, round stems, smooth or with a closely appressed tomentum. The leaves are large, nearly orbicular, peltate, subcordate, entire, aristate at the point, smooth above, silky pubescent beneath, and of a dark-green color; they are supported on downy footstalks, which are inserted into the back of the leaf. The flowers are very small, hispid, unisexual and disposed in racemes. The male flowers with four sepals in a double

range, and four petals forming a cup-like corolla, with an entire margin; the female flowers have but a single sepal and petal; *stamens* united, bearing connate anthers opening horizontally; *peduncles* solitary or in pairs, branching from the base, as long as the petiole or longer, racemose-corymbose, with divaricating downy ramifications. *Racemes*, in the female plant, longer than the leaves, bearing the flowers in spiked fascicles. *Bracts* sessile, somewhat orbicular, scarcely mucronate. *Ovary* solitary, and surmounted with three stigmas. *Berries* scarlet, round, reniform, compressed, shriveled, thinned to the edge, all over hispid with long hairs.

History.—This plant is a native of South America, and the West Indies. The root is the officinal part. It is in pieces or billets from half an inch to four or five inches in diameter, and from a few inches to two or more feet in length, cylindrical, sometimes forked or contorted, and covered with a thin, firmly adhering, grayish-brown-bark; it is often split longitudinally. The outer surface is marked with longitudinal and annular wrinkles, and sometimes with knotty excrescences. The interior is of a yellowish hue, ligneous, very porous, and displaying a number of concentric circles traversed by many radiating lines, inodorous, and of a sweetish, nauseous, intensely bitter, and somewhat aromatic taste. It readily imparts its taste and active properties to water or alcohol. It contains a soft resin, a yellow bitter principle, a brown substance, an azotized matter, fecula, acidulous malate of lime, nitrate of potassa, and various other salts. The active property of the root depends upon an alkaloid, which is called *Cissampelin*, or *Pelosin*, said to be a white powder, uncrystallizable, insoluble in water, soluble in alcohol, ether, and the acids, of an intensely bitter and sweetish taste, and forming soluble salts of which the hydrochlorate crystallizes.

Properties and Uses.—Tonic, diuretic and aperient. Used in chronic inflammation of the bladder, and various disorders of the urinary organs. Also recommended in calculous affections, leucorrhea, dropsy, rheumatism and jaundice. Dose, of the infusion, from one to four fluidounces; of the extract, from ten to twenty grains.

The *Cissampelos Glaberrima*, growing in Brazil, a species of this plant, appears to possess similar properties.

Off. Prep.—Infusum Pareiræ.

CITRUS AURANTIUM.

Orange.

Nat. Ord.—Aurantiaceæ. *Sex. Syst.*—Polyadelphia Icosandria.

THE PEEL OR OUTER RIND

Description.—Citrus Aurantium is a middle-sized evergreen tree, much branched, and covered with a smooth, shining, greenish-brown

bark. *Branches* generally with axillary spines. *Leaves* alternate, entire, ovate-oblong, acute, a little serrulated, of a shining-green color, and with footstalks more or less winged. The *flowers* are large, white, and very fragrant, and arise from the smaller branches on simple and divided peduncles. The *calyx* is saucer-shaped, and divided into five pointed sepals. The *petals* are five, oblong, concave, white, and beset with numerous small glands. The *stamens* are twenty or more, united at their base into three or more sets, and support vertical, yellow anthers. The *ovary* is superior, roundish, bearing a cylindrical style, terminating with a globose stigma. The *fruit* is globose, depressed, of a reddish-yellow color externally, and internally divided into several cells, filled with a mucilaginous pulp; each cell containing from two to four white seeds, with a cartilaginous skin. The *rind* of the fruit is double, consisting of an external thin and glandular layer, filled with a fragrant essential oil, and of an internal one, thick, white, spongy, insipid, and inodorous.

History.—The orange is a native of China and India, and is cultivated in the southern parts of Europe and America, and in the West Indies. Its varieties are numerous. The fruit likewise differs in its character, that of the *C. Aurantium* being sweet, while that of the *C. Vulgaris*, or *C. Bigaradio*, the Seville orange, is sour and bitterish. The leaves are studded with vesicles containing an essential oil, and have a bitter aromatic taste, and when rubbed between the fingers are highly fragrant. They yield by distillation an oil termed *Essence de Petit Grain*.

An infusion of them is sometimes employed as a gently stimulant diaphoretic. The flowers have a delicious fragrance, which is imparted to the surrounding atmosphere, but which is lost by drying; those of the bitter orange are considered the most delicate. They owe their aroma to an essential oil, which may be obtained by distillation; it is termed *Oil of Neroli*, and is much used in perfumery. An *orange flower water* is prepared in Italy and France, which is nearly colorless, has a rich odor of the flowers, and a bitterish, aromatic taste; it is used exclusively as a perfume, although reputed to possess antispasmodic virtues. The peculiar fragrance of the flowers may be preserved for a long time by beating them into a pulp with one-fourth their weight of common salt. The juice of the orange consists chiefly of sugar, mucilage and citric acid. The outer rind of the mature fruit is the officinal part, the inner being destitute of useful properties, and the two should always be separated from each other when drying the rind for medical purposes, as the spongy, inner rind by its affinity for moisture produces a disposition in the peel to become moldy. Orange peel has a deep orange color, a grateful aroma, and a pleasant bitter taste, that of the Seville orange being much more bitter than that of the other variety. It contains a volatile oil in visible vesicles, and which is lost in drying, a saccharine principle, a bitter principle, and ligneous fiber. The volatile oil may be obtained by expression from the fresh-grated rind, or by

distillation with water. Water or alcohol takes up the sensible properties of the rind. The finest Orange oil, which must not be confounded with the Oil of Neroli, is obtained from Portugal, and is prepared from the rind of the sweet orange. It has a pale straw tint, and a rich fragrance of the rind. It is imported in tinned copper cans, and is much used in perfumery and for other purposes. On exposure it spoils rapidly, acquiring a terebinthinate odor. When about the size of a pea or cherry, the fruit is sold under the name of Orangettes or Curacoa Oranges; and the small ones are sometimes used to maintain the discharge from issues.

Properties and Uses.—Orange peel is a mild bitter tonic, carminative and stomachic. It is seldom used alone, but is employed generally to flavor other medicines, or to correct their nauseating tendency. It thus forms a very useful addition to bitter tinctures, infusions, or decoctions, as of cinchona bark, quassia, columbo, etc.; though care should be taken not to subject it to long boiling, on account of its oil, which will thus be driven off. As a tonic the rind of the Seville orange is preferred; its dose in substance is from thirty to sixty grains, three times a day. Large quantities of it have caused violent colic, convulsions, and even death. The juice of the orange is not only a light refrigerant article of diet, but has a direct beneficial medicinal influence in several diseases; as in all fevers and exanthematous diseases, where acids are craved, and the patient's tongue is coated brown, black, or any intermediate color; in such cases its free use may be allowed with advantage; it is also useful as an antiscorbutic in scurvy. In administering the juice, the membranous portion should always be carefully rejected. The distilled water of the flowers are said to have proved beneficial in chorea, hysteria, epilepsy, and many other nervous disorders, in doses of one or two ounces.

Off. Prep.—Aqua Florum Aurantii.

CITRUS LIMONUM.

Lemon.

THE OUTER RIND AND JUICE.

CITRUS ACIDA.

Lime.

THE JUICE.

Nat. Ord.—Aurantiaceæ. *Sex. Syst.*—Polyadelphia Icosandria.

Description.—The Lemon tree is an evergreen, about twenty feet in height, with flexible branches. The leaves are firm, alternate, ovate-oblong,

crenate or serrulate, smooth, shining, pale-green, with a winged petiole. The *flowers* are large, white, with a tinge of pink on the outside, and arise from the smaller branches. The *calyx* and *petals* resemble those of the orange, *which see*. The *stamens* are from twenty-five to thirty. The *ovary* is ovate. The *fruit* is ovate-oblong, uneven, and terminated by a more or less elongated knob, or nipple-like protuberance; the *rind* is of a straw-yellow color, and consists, similar to the orange, of two coats, an outer thin and yellow, abounding in a fragrant oil, and an internal thick, whitish and coriaceous. *Cysts* in the rind concave. *Pulp* juicy, very acid.

The **LIME**, *Citrus Acida*, (or *Citrus Limetta*, *Risso*,) is a tree about eight feet in height, with a crooked trunk and diffuse branches with prickles. The *leaves* are ovate, obovate, oblong and serrate, being placed upon petioles not winged as in the orange and lemon. The *flowers* are small and white. *Stamens* thirty. *Fruit* ovate or roundish, pale-yellow, with a boss at the point, and about an inch and half in diameter. *Cysts* in the rind concave. *Pulp* subacid, flat, slightly bitter.

History.—These plants are of Asiatic origin, and cultivated in the West Indies, and some other tropical countries; this market is supplied chiefly from the West Indies and the Mediterranean. The exterior rind of the lemon, and the juice of its pulp, are officinal. The rind or lemon peel has a fragrant odor, and a warm, bitter, aromatic taste, which depend upon a volatile oil contained in the minute vesicles with which it is filled, and which, when obtained by distillation with water, or expression, forms the oil of lemon, of commerce. (*See Oil of Lemon*.) Lemon peel yields its virtues to water, wine, and alcohol.

Lemon juice has an intense, grateful, acid taste, and a slight odor of the rind. It is often kept in a separate state by adding a tenth of strong brandy, or a tenth of alcohol, and then filtering off the mucilage which separates; it becomes slightly bitterish after a time, but retains its strong acidity undiminished. Lemon syrup is another form in which the juice is preferred. However, it is very liable to spontaneous decomposition, becoming unfit for medical use, hence, citric acid in solution, is its best medicinal substitute; nine drachms and a half of this acid dissolved in a pint of water, form a solution of the average strength of lemon juice, to which a few drops of oil or essence of lemon may be added. Lemon juice contains 2.5 per cent. of solid matter, of which 1.77 is citric acid, and the rest chiefly mucilage and malic acid. The finest lemons are those which are smoothest and thinnest in the skin.

The *lime* is smaller than the lemon, with a smoother and thinner rind, oval, rounded at the extremities, of a pale or greenish-yellow color, and abounding in an acid juice, which is chiefly used in the manufacture

of citric acid. A variety of the lime tree, *C. Limetta*, furnishes a fruit from the rind of which is obtained the *Oil of Bergamot*.

Properties and Uses.—Lemon peel is used in cookery and confectionary, and also in medicine to qualify the taste and increase the power of bitter infusions and tinctures, its virtues are similar to that of the orange peel. The *juice* of lemon is tonic, refrigerant and antiscorbutic, forming a refreshing and agreeable drink, possessing some medicinal influence, called *Lemonade*, and which, as with orange juice, may be used freely and advantageously in the febrile and inflammatory diseases, for which this last has been recommended. It may also be added to the nutritive drinks of the sick, as gum water, gruel, barley-water, etc. Its power of preventing and arresting scurvy is unequalled by any other remedy, except a liberal supply of fresh vegetables of the Cruciform family. In scurvy, an ounce or an ounce and a half of the juice per day, is a preventive dose, and when the disease manifests itself, four or six ounces per day will arrest it. Occasionally, but rarely, it fails to effect any benefit in this disease. Ships destined for long voyages should always be provided with a supply of lemon syrup, or citric acid with oil of lemon. Lemon juice has been used as an external application in pruritus of the scrotum, and in uterine hemorrhage after delivery.

Off. Prep.—*Acidum Citricum*; *Liquor Potassæ Citratis*; *Syrupus Limonis*.

CLEMATIS VIRGINIANA.

Virgin's Bower.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE BARK, LEAVES AND BLOSSOMS.

Description.—*Clematis Virginiana* is a perennial, climbing plant, with a stem from eight to fifteen feet or more in length, supporting itself on shrubs, fences and brushwood, by means of its long petioles. The *leaves* are deep-green, ternate; *leaflets* ovate, cordate, acuminate, lobed, cut-dentate, and from two to three inches in length by one or two in breadth; *flowers* in clusters, paniculate, often diœcious; *panicles* large, axillary, dichotomous. *Sepals* four, white, spreading, oval-oblong, obtuse. *Stamens* from twenty-eight to thirty-six. *Fruit* furnished with long, plumose tails, appearing in large, downy tufts; *seeds* compressed.

History.—The *Clematis Virginiana* is a native of the United States, and grows by river-banks, in hedges and thickets, from Canada to Georgia and the Mississippi. It flowers in July and August. The parts

used are the bark, leaves, and blossoms, which yield their virtues to water or alcohol. The leaves should be gathered when they are fully grown, say in August, spread in the shade, and after drying thoroughly, should be closely pressed and packed in firm papers to exclude the air as much as possible, or what is better, should be placed into well closed glass jars, whose mouths are sealed, or covered with oiled silk, bladder, or other impervious material.

The *C. Viorna* or *Leather Flower*, which is more common in the western States, and may be found growing in woods from Pennsylvania to the Mississippi, may, probably, be employed as a substitute for the above. It differs from it in having a cylindrical, striate stem; with opposite, decompound, pinnately divided *leaves*, consisting of from nine to twelve ovate-lanceolate leaflets, acute at each end, entire or three-lobed; *flowers* large, purple, nodding, solitary axillary, campanulate; *sepals* thick, leathery, acuminate, and peduncles from three to six inches long, with a pair of small, simple, entire leaves near the middle.

Properties and Uses.—When applied to the skin in a fresh state, they blister it; and if taken internally, act as a corrosive poison. Both drying and boiling destroy the virulent property. They have been used externally in the treatment of several cutaneous affections, and in the form of a liniment made with oil for the cure of itch; internally, as diuretics and sudorifics in chronic rheumatism, palsy, etc., in minute doses. The extract, in doses of one or two grains, is recommended for osteo-copic pains. The green leaves bruised are sometimes employed to produce vesication, also, as an escharotic and detergent for venereal and other foul and indolent ulcers.

Prof. C. H. Cleveland, of Cincinnati, speaks highly of the *C. Virginiana* as a nervine in uterine diseases; he places two drachms of the dried leaf into a cup filled with hot water, covers it, and allows it to stand until the liquid is cool enough to drink; strain, sweeten with sugar if desired, and let the patient drink it at once. Repeated as often as may be required, the doses being regulated by its effects upon the system. The root of the *C. Dioica*, a native of Jamaica, boiled with sea-water, acts as a powerful hydragogue cathartic, and is useful in dropsy; and an infusion of the leaves and flowers, removes spots and freckles from the skin. The roots of the *C. Vitalba* boiled for a short time to diminish their acrimony, and then infused in boiling oil, were applied to the skin several times a day, in itch, and a cure was effected in twelve or fifteen applications.

COCCULUS PALMATUS.

Colombo.

Nat. Ord.—Menispermaceæ. *Sex. Syst.*—Dioecia Hexandria.

THE ROOT.

Description.—Colombo is a climbing plant, with a perennial *root*, formed of a number of fasciculated, fusiform, somewhat branched, fleshy, curved, and descending *tubers*, of the thickness of an infant's arm, covered with a thin, brown epidermis, marked, especially toward the upper part, with transverse warts; internally they are deep yellow, inodorous, very bitter, and filled with numerous, parallel, longitudinal fibers or vessels. The *stems*, of which one or two proceed from the same root, are annual, herbaceous, about as thick as the little finger, simple in the male plant, twining, branched in the female, rounded, green; in the full-grown plant, below, thickly clothed with succulent, longitudinal hairs, which are tipped with a gland. The *leaves* are alternate, large, the younger ones thin, pellucid, bright-green, generally three-lobed, upward gradually more numerous; older ones remote, a span in breadth, nearly orbicular, deeply cordate, five to seven-lobed, the lobes entire, often deflexed, wavy on the surface and margin, dark-green above, paler beneath; hairy on both sides; the nerves according to the number of lobes, are three, seven, or nine, pale, connected by veins which, in themselves, are reticulated, prominent beneath. *Petioles* about as long as the leaves, rounded, glandulosopilose, thickened below. The *flowers* are small and inconspicuous, and are arranged in the male plant in solitary, axillary, drooping, compound *racemes*, covered with glandular hairs, and with small caducous bracts at the base; in the female also axillary, solitary, simple, spreading, shorter than those of the male. The *calyx* is glabrous, of six sepals, arranged in a double series. The *corolla* consists of six pale-green petals in a single row; The *stamens* are six, with terminal, truncate, four-celled anthers. The *pistils* are three, of which two are often abortive; *stigma* spreading. The *fruit* is drupaceous or berry, about the size of a hazelnut, densely clothed with long spreading hairs, tipped with a black, oblong gland. The *seeds* are somewhat reniform, of a black color, and transversely striate.

History.—This plant inhabits the forests near the coast of Mozambique, and Oibo in East Africa, and has been cultivated at Madras, and in the Isle of France. It was formerly incorrectly described as *Menispermum Palmatum*, and has only recently been properly investigated and classified. It grows abundantly on the south-eastern coast of Africa, in the neighborhood of Mozambique, where it is known by the name of *Kalumb*. The root is dug up in the dry season in the month of March,

and only the fusiform offsets are taken, as the main root is too fibrous and woody; these are transversely sliced, strung on cords, and dried in the shade. As met with in the shops, the roots consist of transverse sections, from half an inch to three inches in diameter, and from one-eighth of an inch to one inch in thickness. These sections are flat, circular, or oval, and composed of a thin, outer epidermis, brown and wrinkled,—a thick, bright-yellow inner bark, of a slightly-greenish color internally,—and a light, spongy, yellowish, ligneous internal or medullary portion, usually more or less shrunk, so that the center of the sections are the thinnest, and frequently marked with concentric circles and radiating lines. Those pieces are the finest which are the most compact and uniform in their texture, least worm-eaten, and have the brightest color. The root is brittle and easily pulverized, the powder having a pale greenish-yellow tint, becoming darker by age, a faint aromatic odor, a strong bitter taste, without acrimony or astringency. The cortical portion of the root possesses the greatest intensity of bitterness. It readily imparts its bitterness to water, alcohol, or ether. The powder undergoes decomposition by attracting moisture from the air, and should, in consequence, be prepared in small quantities at a time, and kept in well-corked bottles. Colombo contains an azotized substance, in large quantity, a bitter yellow substance not precipitated by metallic salts, one-third its weight of starch, a small proportion of volatile oil, salts of lime and potassa, oxide of iron, and silica, beside colombin and berberin. It may be known from American Colombo, by an infusion of the latter becoming dark-green with the sesquichloride of iron, and not being affected by the tincture of galls; while the imported is not affected by the iron, and yields a copious grayish precipitate with galls.

Colombin may be obtained by exhausting Colombo by means of alcohol of sp. gr. 0.835, distilling off three-fourths of the alcohol, allowing the residue to stand for some days till crystals are deposited, and lastly, treating these crystals with alcohol and animal charcoal. The mother waters still contain a considerable quantity of colombin, which may be separated by evaporating with coarsely-powdered glass to dryness, exhausting the residue with ether, filtering, distilling off the ether, treating the residue with boiling acetic acid, and evaporating the solution so that crystals may form. The crystals are in beautiful transparent quadrilateral prisms, inodorous, and extremely bitter. They are soluble in boiling alcohol, which deposits them on cooling, and but slightly soluble in water, alcohol, or ether, at 60°, although the bitter taste is imparted to these fluids. Diluted acetic acid is the best solvent. Alkaline solutions take up colombin, and from which acids precipitate it. It has neither acid nor alkaline reactions.

Berberin exists more largely in the Colombo root, than Colombin, it exists in combination with *Colombic Acid* forming a Colombate of

Berberin, which exists in the thick layers of the cell membranes, while colombin occurs in the cells of the root in a crystalline state. It may be obtained by exhausting colombo with alcohol of 0.889, distilling off the alcohol, allowing the residual liquor to stand for three days so as to deposit its colombin, then evaporating the supernatant liquid, together with the aqueous washings of the colombin, to dryness, exhausting the residue with boiling alcohol of 0.863, treating the solution thus obtained as the former one, submitting the residue to the action of boiling water, filtering and adding muriatic acid, collecting the precipitated muriate of berberin thus formed, on a filter, drying it with bibulous paper, and finally, to separate adhering acid, dissolving it in alcohol, and precipitating with ether. The precipitate will be a bright yellow powder, imperfectly crystalline, and disagreeably bitter.

Precipitates of the solutions of Colombo are caused by infusion of galls, acetate of lead, corrosive sublimate, and lime-water, but which do not affect its bitter principle.

Properties and Uses.—A pure, bitter tonic. Used in dyspepsia, chronic diarrhea, and dysentery; in convalescence from febrile and inflammatory diseases, hectic fever, and in the muscular debility of young children. It has been recommended in sympathetic vomiting, not connected with inflammation of the stomach, as in that of pregnant women. Like other strong bitters, it occasionally checks the remittent and intermittent fevers of hot climates. A powerful tonic may be formed of the alcoholic extract of the root. In dyspepsia, and vomiting it may be advantageously combined with the alkaline bicarbonates, as well as in debility with acidity of the stomach. It is used in various combinations, with aromatics, antacids, cathartics, or other tonics. Dose of the powder, from ten to thirty grains, three or four times a day; of the infusion, from one to two fluidounces; of the tincture, from one to two fluidrachms.

Off. Prep.—Infusum Colombæ; Tinctura Colombæ; Vinum Symphyti Compositum.

COCCUS CACTI.

Cochineal.

History.—The cochineal insect, *Coccus Cacti*, belongs to the class *Insecta*, order *Hemiptera*; it is characterized by its depressed, downy, transversely wrinkled body, its purplish abdomen, its short and black legs, and its subulate antennæ, which are about one-third of the length of the body. It is found wild in Mexico and the adjoining countries, where it feeds on the different species of *Cactus* and the allied genera, but especially the *Opuntia Cochenillifera*, on which it thrives best. They are collected at various seasons. The best are the product of the first

collection, which consists of the impregnated females ; the males are not collected. Those killed by the heat of a stove, are said to be superior to those destroyed by boiling water. As obtained in the shops, Cochineal is in irregularly-circular or oval, somewhat angular grains, about one-eighth of an inch in diameter, convex on one side, concave or flat on the other, and marked with several transverse wrinkles. There are two varieties, one of a reddish-gray color, *silver grains*, the other almost black, *black grains* ; there is no difference in their quality.

The Silver Cochineal is said to consist of the female insect killed before it has laid its eggs ; Black Cochineal, of the female after having laid its eggs ; the first is the most esteemed. There is also an inferior sort, consisting chiefly of young insects, called *Granilla*.

Cochineal has a faint heavy odor, and a bitter, slightly acidulous taste ; its powder is of a purplish-carmine color. It consists of carmine, animal matter, stearin, olein, etc. The coloring matter of cochineal is dissolved out by water, alcohol, and proof spirit.

Carmine may be prepared by boiling one pound of powdered cochineal and three drachms and a half of subcarbonate of potassa, in a boiler containing seven gallons of water. After boiling for a few minutes, take the boiler off the fire, and place it on a table, inclined to one side so as to facilitate decantation. Add powdered alum, eight drachms, and stir the solution. The liquor changes color and assumes a more brilliant tint. After a quarter of an hour, the cochineal will have deposited, and the liquor have become as clear as if it had been filtered. It contains the carmine in suspension. The liquor is then decanted into a similar pan, and placed on the fire, adding three drachms and a half of isinglass, which has been previously dissolved in two quarts of water and strained. At the moment of ebullition the carmine rises to the surface, and a coagulum forms as in clarification with white of egg. The pan is then removed from the fire, and the liquor stirred with a spatula. After a quarter of an hour the carmine will be deposited, when the liquor is to be decanted, and the deposit drained on a strained filter, and then dried in a stove at a temperature from 82° to 86°. If dried in the open air it will become moldy. This makes a very fine carmine. The remaining solution will make fine carminated lake. A fine red ink may be made as follows: Take of cochineal in powder eight scruples, carbonate of potassa sixteen scruples, distilled water eight fluidounces, mix together and boil ; then add of alum four scruples, bitartrate of potassa two ounces ; let them stand for twenty-four hours, filter, and add of powdered gum Arabic half an ounce.

Properties and Uses.—Anodyne. Used in hooping-cough, and neuralgic affections. Also used to color tinctures and ointments. Dose, from five to ten grains, three or four times a day.

Off. Prep.—Tinctura Cardamomi Composita.

COCHLEARIA ARMORACIA.

Horseradish.

Nat. Ord.—Brassicaceæ. *Sex. Syst.*—Tetradynamia Siliculosa.

FRESH ROOT.

Description.—Horseradish root is perennial, thick, tapering, white, long, acrid, and very tenacious of life, sending up numerous very large leaves, from the midst of which a round or angular, smooth, erect branching *stem* rises, two or three feet in height; those branches which flower are corymbose, smooth, angular. The *radical leaves* are near a foot long, half as wide, oblong, crenate-toothed, waved, sometimes pinnatifid, of a dark-green color, and stand upon long, channeled petioles; the *cauline leaves* are smaller, lanceolate, dentate or incised, sessile, sometimes entire, and without footstalks; the lower ones often pinnatifid. The *flowers* are numerous, small, white, peduncled, and in terminal corymbose racemes. The *calyx* spreading with four ovate, concave, and deciduous sepals. The *corolla* consists of four obovate, unguiculate petals, twice as long as the sepals. The *stamens* are as long as the calyx, incurved, and supporting heart-shaped anthers. The ovary is oblong, with a short style, bearing a short capitate stigma, and changing into an elliptical, compressed, bilocular pod or silicle, containing about four seeds in each cell, many of which are abortive.

History.—This is a well-known succulent plant, a native of Europe, and extensively cultivated for the use of its roots as a condiment. Its flowers appear in June. The fresh root is the officinal part and should be dug up in the autumn, as its acrimony is then the strongest; it may be preserved for some time fresh, by burying it in a cool place in sand. The root is whitish externally, very white within, fleshy, fibrous, of a strong, pungent odor when bruised or scraped, exciting violent sneezing and secretion of tears, and of an exceedingly pungent, somewhat sweetish taste. Water, alcohol, or vinegar extracts its properties, which depend upon the presence of a volatile oil, and which is dissipated by heat or desiccation.

The oil may be obtained by distillation with water, but not with alcohol; it is colorless or pale yellow, heavier than water, very volatile, excessively pungent, acrid, and corrosive, exciting inflammation and even vesication when applied to the skin. It is supposed to be perfectly identical with the volatile oil of mustard, and is obtained in minute proportion, six parts only of the oil being procured from ten thousand of the root. It is believed not to exist already-formed in the unbroken root, but to be developed by the mutual reaction of its constituents when the root is bruised. The dried root possesses no pungency, and yields

no volatile oil when distilled with water, unless white mustard be added ; the myrosine of the mustard supplying some necessary principle destroyed by desiccation. In addition, the root contains a bitter resin, sugar, gum, starch, extractive, albumen, acetic acid, acetate and sulphate of lime, water and lignin.

Properties and Uses.—Stimulant, diuretic, antiscorbutic, and rubefacient. It excites the stomach when swallowed, and promotes the secretions, especially that of urine. The infusion is emetic. It has been used with advantage in chronic affections attended with debility of the digestive organs, and of the system in general, as in paralysis, rheumatism, dropsy, and as an antiscorbutic in scurvy. In dropsy, an infusion of the root in cider and drank as warm as could be borne, in large quantities and freely, the patient being warmly covered up, has caused copious diuresis and diaphoresis, and cured the disease in a few weeks; the operation being repeated nightly, or as the strength of the patient would permit. It enters into the following excellent preparation, which has often cured dropsy alone, but the use of which is generally preceded by active hydragogues ;—Take of Parsley roots and tops, Carbonate of Iron, of each four ounces ; Juniper berries, Squills, White Mustard seed, Mandrake, Queen of the meadow root, of each, one ounce, Horseradish two ounces ; good Cider, not new or too hard, six quarts. Place the whole in an unglazed earthen vessel, cover, and digest with heat for twenty-four hours. Dose, a wineglassful three or four times a day. The grated root with sugar to form a syrup with water, is excellent for hoarseness, a spoonful or two may be swallowed as occasion requires. It has been also used externally, as a rubefacient. Dose of the root grated, from one to two drachms.

The *Cochlearia Officinalis*, or scurvy grass is seldom used in medicine ; it possesses similar properties.

Off. Prep.—Infusum Armoraciæ.

COFFEA ARABICA.

Coffee.

Nat. Ord.—Cinchonaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE SEEDS.

Description.—Coffee tree is an evergreen shrub, growing from twenty to thirty feet in height, with an erect stem, covered with a brownish bark. The branches are opposite, the lower spreading, the upper somewhat declining, and gradually diminishing in length as they ascend, so as to form a pyramidal summit, which is covered with a green foliage through-

out the year. The *leaves* are opposite, ovate-lanceolate, entire, acuminate, smooth and shining, bright-green above and paler below, four or five inches long, on short petioles, and accompanied with a pair of small, undivided, subulate stipules. The *flowers* are white, having an odor similar to jasmine, sessile, and are in clusters of four or five together, in the axils of the upper leaves; *peduncles* short. The *calyx* is very small, superior, five-toothed. The *corolla* is funnel-shaped, with a flat border divided into five spreading, lanceolate, pointed segments. The *stamens* are inserted into the tube of the corolla, and have yellow, linear anthers. The *ovary* is inferior, ovate, and supports a simple style, with two awl-shaped, reflexed stigmas. The *fruit* or *berry* is globular, about the size of a cherry, umbilicated at the summit, deep-purple, two-celled, two-seeded, and containing a yellowish pulpy matter. The *seeds* are hemispherical, convex on one side, and flat on the other with a longitudinal furrow, of a pale glaucous color, and invested in a thin, elastic, somewhat translucent arillus; they constitute the coffee of commerce.

History.—Coffee is a native of Southern Arabia and Africa, and is cultivated in various parts of the world, between the latitudes of 55° north and south. The tree is raised from the seeds, which are sown in proper soil, and germinate in less than a month, producing plants which are sufficiently large for transplanting at the end of the year. They are then placed in rows, and begin to bear fruit in three or four years. The seeds are known to be ripe when the berries assume a dark-red color, and if not gathered will drop spontaneously. When gathered, they are dried, and their papyraceous envelope removed.

There are many varieties of coffee in commerce, the characters of which depend upon the soil, the climate, and the mode of culture. The *Mocha Coffee* is esteemed the best, and the *Java* next; but the principal supply in this country is from the West Indies and South America. Good coffee should be hard, and so heavy as to readily sink in water; age improves its flavor; soft, light, black or dark-colored, or musty grains are of inferior quality.

Coffee has a faint, peculiar odor, and a slightly-sweetish, somewhat austere taste. It contains cellulose, hygroscopic water, fatty matter, glucose, dextrine and a vegetable acid, legumin, chlorogenate of potassa and caffein, free caffein, concrete volatile oil, fluid volatile oil, and mineral substances. *Caffein* may be obtained in the following manner: Exhaust bruised coffee by two successive portions of boiling water, unite the infusions, add acetate of lead in order to precipitate the principles which accompany the caffein, filter, decompose the excess of acetate of lead in the filtered liquor by sulphureted hydrogen, and evaporate to the point of crystallization. Concentrate by evaporation, and neutralize with ammonia. The crystals which form upon cooling, may be

redissolved in water, treated with animal charcoal, and the solution be again evaporated.

H. J. Versman states the following to be the most profitable and simple mode of obtaining caffein: "Ten parts of bruised coffee are mixed with two parts of caustic lime, previously converted into hydrate of lime. This mixture is placed in a displacement apparatus, with alcohol of 80°, until the fluid which passes through no longer furnishes evidence of the presence of caffein. The coffee is then roughly ground, and brought nearly to the state of a powder, and the refuse of the already once digested mixture from the displacement apparatus dried, and ground again, and, mixed with hydrate of lime, is once more macerated. The grinding is more easily effected after the coffee has been subjected to the operation of the alcohol, having lost its horny quality, and the caffein is thus certainly extracted. The clear alcoholic fluid thus obtained is then to be distilled, and the refuse in the retort to be washed with warm water to separate the oil. The resulting fluid is then evaporated until it forms a crystalline mass, which is to be placed on a thick filter, and the moisture expressed. The moisture, after evaporation, still furnishes some caffein. The impure caffein is freed from oil by pressure between folds of blotting-paper, and purified by solution in water with animal charcoal, and then crystallized by evaporation. Good Brazilian coffee, thus yields 0.57 per cent. of caffein.

Caffein crystallizes by the cooling of its concentrated solution, in white, opaque, silky, flexible needles; by slow and spontaneous evaporation, in long, transparent prisms. It has a feebly bitter and disagreeable taste, is soluble in water, alcohol, and ether, melts when exposed to heat, and at a higher temperature sublimes, without residue, into needles analogous to those formed by benzoic acid. It is precipitated from its aqueous solution by no reagent except tannic acid, and is remarkable for containing a larger proportion of nitrogen than any other proximate vegetable principle; and in this respect equals some of the most highly animalized products. It is a feeble base, but forms very large crystalline salts with sulphuric and muriatic acids. Its composition is considered to be $C_8 N_2 H_5 O_2$, and it is believed to be identical with théin, the peculiar principle of tea.

Notwithstanding the quantity of nitrogen in its composition, caffein does not putrefy, even when its solution is kept for some time in a warm place.

The Hanoverian Pharmacopœia directs caffein to be made by precipitating a decoction of coffee with acetate of lead, filtering and washing the precipitate, evaporate the liquids to dryness, and after mixing the powdered extract with sand, the mass is sublimed in a Mohr's apparatus, just as in making benzoic acid.

Coffee undergoes considerable change during the roasting process. It swells up very much, acquiring almost double its original volume, while

it loses about 20 per cent. of its weight. It acquires, at the same time, a peculiar odor entirely different from that of the unaltered grains, and a decidedly bitter taste. A volatile oil is developed during the process, and according to Chenevix, a portion of tannin. The *caffein* does not appear to undergo material change, as, according to Garot, it may be extracted unaltered from the roasted coffee. The excellence of the flavor of roasted coffee depends much upon the manner in which the process is conducted, and the extent to which it is carried. It should be performed in a covered vessel, over a moderate fire, and the grains should be kept in constant motion. When these have acquired a chestnut-brown color, the process should cease. If too long continued, it renders the coffee unpleasantly bitter and acrid, or by reducing it to charcoal, deprives it entirely of flavor. The coffee should not be burnt long before it is used, and should never be kept in the ground state, as it loses much of its agreeable flavor and activity.

Properties and Uses.—An infusion of roasted coffee is an agreeable stimulant, antispasmodic, and antiemetic. It moderately excites the circulatory system, and stimulates the digestive function; though if taken in large quantities it produces troublesome nervous and dyspeptic affections. A cup of strong coffee will cause a degree of wakefulness for several hours, and it may be administered for the purpose of resisting, to a certain extent, the intoxicating and soporific influence of opium and alcohol. In poisoning from opium, it should always be given. It has also proved temporarily useful in light nervous headaches, asthma, hysteria, obstinate chronic diarrhea, and also calculous nephritis. It is contra-indicated in all inflammatory affections of a high grade. Dr. A. Brown, of Cincinnati, has found a strong decoction of the pulverized, unroasted coffee, a superior remedy in some forms of chlorosis and amenorrhea. When fullness of the head, and pain in the back are present, he gives a gentle purgative, then uses the warm foot-bath, and administers the decoction in wineglassful doses every half hour or hour.

Coffee has also been used with much success in whooping-cough, in the form of syrup, made with the extract of coffee prepared without heat, or a strong infusion by percolation, given in small and repeated doses. Dr. L. Delahage gives the following formulæ as almost infallible: Take of syrup of extract of coffee four pounds, extract of belladonna, extract of ipecacuanha, of each two scruples. Mix together. Dose, two fluidrachms or a dessertspoonful, morning and noon, and double this dose at night on going to bed, for children of three to five years old; it should be taken in two or three tablespoonfuls of warm water.

The *Citrate of Caffein*, recommended as a remedy for the idiopathic headache, called migraine, (pain in the forehead), may be obtained by two processes; the most simple consists in infusing finely-ground raw coffee in a very weak solution of citric acid, at the temperature of 176° F.,

filtering the liquid while yet hot, adding two-thirds of its volume of ether, and agitating the mixture strongly, to remove the chlorogenic acid from the watery solution. The latter is separated from the supernatant ether, and is carefully evaporated with a gentle heat. The citrate of caffen crystallizes in long needles, which, when redissolved in distilled water and again evaporated, are obtained in beautiful, long acicular white silky crystals, in radiating groups.

The second process consists in making the compound by the direct union of its constituents, the caffen being dissolved in a weak solution of citric acid at the temperature of 112° F., and the solution evaporated till the citrate crystallizes.

This salt is very soluble in water, and is assimilated much more readily than pure caffen when taken into the stomach. It consists of one equivalent of caffen, three of citric acid, and two of water. It may be made into a pill mass with some simple extract, say eight grains of the salt to fifteen of the extract, and divided into ten pills, of which one pill may be given every hour or two. Or, two drachms and a half of the salt may be dissolved in four ounces of simple syrup, of which one tablespoonful may be given as above, according to the violence of the attack.

COLCHICUM AUTUMNALE.

Colchicum.

Nat. Ord.—Melanthaceæ. *Sex. Syst.*—Hexandria Trigynia.

CORMUS OR BULB, AND SEEDS.

Description.—This plant, also called *Meadow Saffron*, is a perennial bulbous plant. The *corm* is large, ovate, solid, fleshy. The *leaves* are dark-green, very smooth, obtuse, above a foot long, an inch and a half broad, carinated, produced in the spring, along with the capsules. *Flowers* several, radical, leafless, bright purple, with a long white tube appearing in the autumn without the leaves. *Capsules* three, distinct, though forming together a single, oblong, elliptical fruit, with intermediate fissures. *Seeds* whitish, polished.

History.—Colchicum grows in meadows, and low, rich situations in many parts of Europe, and is common to England. The herb is annual, but the root is annual or perennial according to the manner in which the plant is propagated, which may be from the seed, by the formation of a single mature bulb from a parent bulb, or by the separation of several immature bulbs from the parent. The manner of growth of the plant deserves a brief notice. In the latter part of the summer, a new bulb or cormus commences forming at the lateral inferior portion of the old one, which receives the young offshoot in its bosom, and embraces it half round.

The new plant sends out fibers from its base, and is furnished with a radical, cylindrical, tubular spathe, cloven at top on one side, and half under-ground. In September from two to six lilac or purple flowers emerge from the spathe, and unaccompanied with leaves; by the end of October these flowers perish, and the rudiments of the fruit remain under-ground until the next spring, when the leaves rise upon a stem above the surface, elevating along with them the germen consisting of three many-seeded capsules, which ripen their seed about midsummer; after this the plant speedily dies and withers. While the flower is rising in the autumn, the bulb is very small, but in the winter it grows rapidly, being in April as large as a chestnut, and attaining its greatest size, about that of a small apricot, in July. It is now a year old, and the herb having matured its seed, is withering away, but a new bulb begins to appear at its lower end, close to its junction with the radicles or root proper, which passes through a similar succession of changes; while the old parent bulb, gradually becomes more spongy and watery, but retains its size until the following April, the second spring of its own existence, when it quickly decays. The seeds and the bulb are the officinal parts of the plant. The bulb attains its greatest perfection about the beginning of July, at which time it should be gathered for medical use. It resembles a small tulip root, rounded on one side, flattened on the other, being brown externally, white internally, and containing an acrid, milky juice. The odor is *hircine*, and the taste unpleasant, bitter and acrid. In drying, the bulb is usually cut into thin transverse slices, having first been stripped of its external dark brownish-black membranous tegument, and is dried quickly; sometimes it is dried entire.

Good colchicum bulbs when dried are of an oval-rounded form, with a notch or deep groove on one side, of a grayish-white color, an amylaceous appearance, firm, dry, and capable of changing their color to blue when softened with distilled vinegar, and then touched with tincture of guaiacum. Its odor is much less than in the fresh bulb, and its taste bitter, hot and acrid. Alcohol, wine, or vinegar extracts its virtues. The acetic tincture is generally preferred to the vinous, as it is not so liable to change or decomposition. Acids render the vinous tincture drastic, while alkalies render its operation milder. It contains a vegetable alkali combined with an excess of gallic acid; a fatty matter composed of olein, stearin, and a peculiar volatile acid analogous to the cevadic; a yellow coloring matter; gum; starch; inulin in large quantity, and lignin. The alkaline principle, formerly supposed to be identical with veratria, has been found to be peculiar, and has received the name of *Colchicia*. Solution of iodine causes a blue precipitate with the decoction of the bulb; the acetate of lead, nitrate of protoxide of mercury, and nitrate of silver cause white precipitates; and the tincture of galls a slight precipitate.

Colchicum seeds should be gathered about the beginning of August, when they are fully ripe; they are rough, roundish, dark-brown externally, white within, about the eighth of an inch in diameter, and of a bitter, acrid taste. It was formerly supposed that their active properties resided in the husk or testa, and it was advised not to bruise them in making the tincture, but recent experiments have proved that the bruised seeds yield the strongest tincture. Their properties are similar with those of the bulb, and as they are considered more uniform in strength than the bulb, they are usually preferred to it.

Colchicia may be obtained by a process similar to that employed in the preparation of hyoscyamia from hyoscyamus. (See the article *Hyoscyamus*). A simpler process is to digest the seeds of colchicum in boiling alcohol, precipitate the tincture with magnesia, treat the precipitated matter with boiling alcohol, and finally filter and evaporate. It is crystallizable, bitter, and very poisonous, and does not, like veratria, cause sneezing when applied to the nostrils, is more soluble in water, and has less poisonous influence on the system. It is soluble in water, alcohol, and ether; nitric acid colors it blue or violet; its salts are crystallizable, acrid, bitter, and poisonous. In a very small dose it causes purging and vomiting.

Properties and Uses.—In large doses, an acro-narcotic poison. Medicinally, sedative, cathartic, diuretic, and emetic. Used in gout and gouty rheumatism, dropsy, palpitation of the heart, gonorrhea, enlarged prostate, etc. Care must be used in its employment. It sometimes increases the uric acid in the urine of arthritic patients; and has been beneficially employed in febrile, inflammatory and nervous affections, and in chronic bronchial complaints. A good acetic tincture may be made by macerating an ounce and a half of the dried bulb, or seeds, in twelve fluidounces of the strongest vinegar for fourteen days. Then filter, and keep in well-stopped bottles. The dose for an adult is from thirty to sixty drops, as often as may be required. An *acetic extract* may be prepared, containing all the powers of the plant, by rubbing the bulbs to a pulp to the quantity of a pound, and gradually adding acetic or pyroligneous acid three fluidounces. Express the liquid, and evaporate it in an earthen vessel not glazed with lead, to the proper consistence; the dose is from one to three grains, three or four times a day. Dose of the dried bulb, from one to eight grains, gradually increased every four or six hours, till the effects of the medicine are obtained.

Off. Prep.—Tinctura Colchici Composita; Tinctura Colchici Seminis; Vinum Colchici Radicis; Vinum Colchici Seminis.

COLLINSONIA CANADENSIS.

Hardhack.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Diandria Monogynia.

THE PLANT.

Description.—This plant, known likewise by various other names, as *Horseweed*, *Heal-all*, *Richweed*, *Ox-balm*, etc., is indigenous with a perennial knotty root, and a herbaceous, simple stem, about two feet high, furnished with two or three pairs of broad, cordate, ovate, serrate, petioled, and smooth leaves, and terminating in a panicle of yellow flowers in branched racemes; the flowers are diandrous and monogynous. *Calyx* bilabiate, upper lip three-toothed, the teeth short, subulate. *Corolla* funnel-form somewhat bilabiate, the lower lip fringed. *Stamens* two; *seeds* four, often two or three of them are abortive.

History.—Hardhack is found growing in rich moist woods, from Canada to Carolina, and flowering from July to September. The whole plant has a peculiar, lemon-like, balsamic odor, rather disagreeable in the root, and a warm, pungent taste. Water or alcohol extracts its virtues; boiling destroys it, as the active principle is volatile. The fresh root is the part used.

Properties and Uses.—Tonic, astringent, diaphoretic, and diuretic. Used in infusion for headache, colic, cramp, dropsy, indigestion, catarrh of the bladder, leucorrhea, gravel, and urinary disorders. The fresh root, in substance, irritates the stomach, causing vomiting even in small doses. Externally, the leaves are used as a poultice or in fomentation to bruises, ulcers, blows, wounds, sprains, contusions, etc. The *Collinsonia Verna*, *C. Cordata*, *C. Ovata*, *C. Scabra*, and other species, probably, possess similar virtues. Dose of the infusion, from half a fluidounce to two fluidounces.

Off. Prep.—Infusum Collinsoniæ.

COLLODION.

ETHEREAL SOLUTION OF GUN-COTTON.

Preparation.—Add Sulphuric Acid eight fluidounces and a half to Nitrate of Potassa, in powder, ten ounces, in a Wedgwood mortar, and triturate them until uniformly mixed; then add of Cotton, freed from impurities and finely-carded, half an ounce, and by means of the pestle and a glass rod, imbue it thoroughly with the mixture for four minutes. Transfer the cotton to a vessel containing water, and wash it, in succes-

sive portions, by agitation and pressure, until the washings cease to have an acid taste, or to be precipitated on the addition of chloride of barium. Having separated the fibers by picking, dry the cotton with a gentle heat; dissolve it by agitation in a mixture of Ether two pints and a half, and Alcohol a fluidounce, and strain. On account of the great volatility of the ether, Collodion should be kept in closely glass-stopped and well-dried bottles.

History.—Cotton acted upon by nitric acid is changed into an explosive substance called Gun-cotton or Pyroxylin. The nitric acid prepared as above, by the action of the sulphuric acid on the nitrate of potassa, affords a gun-cotton which readily dissolves in ether. Gun-cotton is very liable to undergo spontaneous decomposition.

Collodion is a transparent, colorless liquid, of the consistence of syrup, with an ethereal smell; when not kept properly secured, it thickens and becomes unfit for surgical use, frequently depositing acicular crystals of gun-cotton.

Properties and Uses.—When applied to any part of the surface of the body it quickly evaporates, leaving the solid adhesive material, or an artificial epidermis, and its contraction in drying produces local pressure. Used for holding together the edges of incised wounds, for covering ulcers or abraded surfaces with an impervious film not acted upon by water, also used for chapped nipples, leech-bites, erysipelas, and several cutaneous diseases. It may be applied with a brush, or by means of strips of muslin. It has been beneficially used to form an artificial covering to ulcers of the os and cervix uteri, thereby allowing the healing process to go on underneath. In burns it has also proved of utility. The strong contractile power of the collodion is often an objection to its employment; this may be obviated by dissolving first one part of gun-cotton, and then one part of Venice turpentine in twenty parts of ether. Or to give more flexibility to the film, one part of elemi may be added to twelve of collodion. Opacity and elasticity may be imparted to collodion by adding from half a drachm to a drachm of lard, or similar fatty matter, previously dissolved in ether, to an ounce of collodion. An ethereal tincture of saffron or turmeric may be added in sufficient quantity, when desired, to produce a color resembling that of the skin. Collodion may likewise be prepared pliable and without any tendency to crack or break by the following formula: Take of Collodion thirty grammes, Castor oil, and Soft Turpentine, of each fifty centigrammes. Collodion is said to have given instant relief in chilblains.

A *Cantharidal Collodion* has recently been brought into use, for the purpose of vesicating, it may be made as follows: Exhaust, by percolation, a pound of cantharides, with a mixture consisting of a pound of sulphuric ether and three ounces of acetic ether; and in two ounces of this liquid dissolve twenty-five grains of gun-cotton. It may be kept in

a glass-stoppered bottle without change, for an indefinite time. It should be applied to the surface by means of a camel's hair brush, and after the evaporation of the ether, another coat may be given if the surface be not well covered. It produces a blister in three to six hours, and may be applied with greater facility than the ordinary cerate, and is better adapted to cover uneven surfaces. If the evaporation of the ether be restrained by a piece of oiled silk immediately after its application, it will act much more speedily. One per cent. of Venice turpentine added to the above, prevents the disagreeable contraction of the preparation when drying.

COMPTONIA ASPLENIFOLIA.

Sweet Fern.

Nat. Ord.—Myricaceæ. *Sex. Syst.*—Monœcia Triandria.

THE PLANT.

Description.—Sweet Fern is a low, indigenous shrub, with a long, horizontal root, and growing from two to four feet high, the main stem being covered with a rusty, brown bark, which becomes reddish in the branches, and white downy in the young shoots. The *leaves* are numerous, on short peduncles, from three to four inches in length, and half an inch broad, alternate, linear-lanceolate, sinuate-pinnatifid, resembling the leaves of the spleenwort fern, brown, and rather downy on the underside, shining on the upper; *stipules* in pairs, acuminate. *Flowers* green, monœcious, amentaceous, and appearing before the leaves; barren ones in long, erect, cylindrical, loosely imbricated catkins, terminal and lateral, with deciduous, one-flowered bracts; fertile ones in ovate, densely imbricated catkins, situated below the barren ones, with one-flowered bracts. *Stamens* six, adhering in pairs. *Sepals* six, larger than the bracts; *styles* two, capillary. *Fruit* a small, ovate, brown, one-celled nut.

History.—This plant is found growing in thin sandy soils, or dry, stony woods, from New England to Virginia. All parts of it possess a resinous, spicy, aromatic odor, when rubbed or bruised between the fingers. The whole herb is used.

Properties and Uses.—Tonic, astringent, and alterative. Used in diarrhea, dysentery, hemoptysis, leucorrhea, rheumatism, debility succeeding fevers, and in rachitis. A decoction of it is very useful in the summer-complaint of children, when given as an auxiliary: A pillow of the leaves is beneficial to rachitic children, and they may be used as a fomentation in contusions and rheumatism. Dose of the decoction, from one to four fluidounces, three or four times a day.

Off. Prep.—Decoctum Comptoniæ.

CONIUM MACULATUM.

Poison-Hemlock.

Nat. Ord.—Apiaceæ. Sex. Syst.—Pentandria Digynia.

LEAVES AND SEEDS.

Description.—Poison Hemlock, or *Poison Parsley*, as it is sometimes called, is an umbelliferous plant, having a biennial, fusiform, whitish, fleshy root, and a herbaceous, branching stem, from three to six feet high, erect, round, hollow, smooth, shining, glaucous, slightly striated, and copiously marked with brownish-purple spots. The leaves are tri-pinnate; the lower ones very large, and attached to the joints of the stem by sheathing petioles; the upper are smaller, and inserted at the divisions of the branches; both have channeled footstalks. The leaflets are ovate, closely and sharply pinnatifid, with the lower lobes incised, deep-green on their upper surface and paler beneath. The flowers are numerous, small, white, all fertile, the outermost very slightly irregular, they are arranged in erect, terminal, compound, many-rayed and smooth umbels. General involucre ovate, cuspidate, with membranous edges, consisting of from three to seven lanceolate, reflected bracts, with whitish edges; partial involucre of three or four, oval, pointed, spreading bracts, and with the inner side wanting. Petals obcordate, with acute, inflected points, and five in number. The fruit is about a line and a half, or rather less in length, by a line in breadth, roundish-ovate, compressed, of a pale-green color; primary ridges elevated, sharp, undulated; commissures and channels finely wrinkled. The whole plant has a disagreeable, virose smell, which is more powerful when it is bruised or broken.

History.—Hemlock is a native of Europe and Asia, and is naturalized in many parts of the United States. It flowers in June and July. The leaves and seeds are the officinal parts. The proper time for collecting the leaves is when the flowers begin to fade; the footstalks should be rejected, and the leaflets dried quickly, and kept excluded as much as possible from the light and air. The fruit, commonly called seeds, retains its activity much longer than the leaves.

Dried hemlock leaves are of a dark-green color, and have a strong, heavy, narcotic odor, and a nauseous and bitterish taste. The seeds have a yellowish-gray color, a feeble odor, and a somewhat bitterish taste. Alcohol or ether takes up the medicinal properties, and the ethereal extract, which is of a rich, dark-green color, possesses the full virtues of the plant, producing headache and vertigo in a half grain dose. The aqueous extract is uncertain; the alcoholic extract is the best. There has been no satisfactory analysis of this plant, a volatile oil, albumen, resin, coloring matter, a poisonous oil, conia, and salts, have been

found in it. The poisonous empyreumatic oil is obtained by destructive distillation of the leaves. A volatile, alkaline principle termed *Conia* or *Conicine*, is the active agent of the plant; it may be obtained by cautiously distilling from a muriate of lime bath, a mixture of strong solution of potassa with the alcoholic extract of the unripe fruit. The alkaloid passes over into the receiver with the water, and floats upon it like an oil. Or, the full grown, but still green fruit, may be distilled with water, caustic potassa, and slaked lime, from a muriate of lime bath, then neutralize the distilled fluid with sulphuric acid, and concentrate it by evaporation to the consistence of syrup; act on this with a mixture of two parts of rectified alcohol and one of sulphuric ether, and again obtain an extract by evaporation, and finally distil the extract with a strong solution of caustic potassa. As obtained in either of these ways, conia contains,—some water, which may be removed by chloride of calcium,—and also a little ammonia which is separated by exposing it under an exhausted receiver till it ceases to emit bubbles of gas. In the preparation of conia, the fresh leaves or seeds should always be employed, as the alkali undergoes decomposition, by time and exposure. The seeds contain the most of it. Eight pounds of green fruit or seeds, will yield half an ounce of hydrate of conia.

Conia is a yellowish, oily liquid, lighter than water, colorless at first, but becoming brown by oxidation, of an intense, peculiar, suffocating odor, like the urine of mice, and an extremely acrid, benumbing taste. Its density is .878; it is volatile at ordinary temperatures, disengaging ammonia, and depositing a resinous matter, and loses its activity. It is sparingly soluble in water; but forms a hydrate by uniting with about a fourth part of water. It is very soluble in alcohol, ether, the fixed and volatile oils, and also in weak acids, which it neutralizes. It boils at 370° , and distils over with water at 212° . It strongly blues reddened litmus paper; it forms soluble salts with acids which are difficult to crystallize. Weak tincture of iodine yields a white precipitate, which acquires an olive color with an excess of the tincture. Tannic acid gives a white, insoluble precipitate; corrosive sublimate gives a white precipitate; chloride of zinc gives a white gelatinous precipitate, soluble in excess of the conia. Sulphate of sesquioxide of iron and chloride of platinum yield yellow precipitates; chloride of gold a light yellow. Chloride of cobalt yields a blue precipitate which changes to green, and which forms with ammonia a red solution. Acetate of copper gives a gelatinous blue precipitate. The red permanganate of potassa is immediately decolorized. Hydrochloric acid yields white clouds as ammonia does, and renders it violet, especially when heated. Nitric acid imparts to it a topaz color, unchanged by heat. Pure and concentrated sulphuric acid does not alter it; but if heated produces a greenish-brown color, which becomes blood-red, and finally black, if the heat be continued. It coagulates albumen, and precipitates the salts of copper,

lead, zinc, aluminum, manganese, and iron. It also precipitates nitrate of silver, but in excess redissolves the precipitate. Its salts are mostly decomposed by evaporation. The actions of conia upon the system closely resemble those of the hemlock itself. A drop of it injected into the eye of a rabbit, caused death in nine minutes, and three drops killed a strong cat in a minute and a half; its effects are gradual paralysis, slight convulsive tremors, and death from suspension of the breathing, without any change in the appearance of the blood, and without any depression of the heart's action. It acts on the spinal marrow. It consists of carbon, hydrogen, and nitrogen. (N C₁₇ H₁₇.)

Properties and Uses.—Narcotic. When given in doses sufficient to affect the system, it causes more or less vertigo, dimness of vision, nausea, faintness, sensations of numbness, and general muscular debility. In larger doses it occasions dilated pupils, difficulty of speech, delirium, or stupor, tremors and paralysis, and frequently convulsions and even death. Its operation usually commences in less than half an hour, and continues for from twelve to thirty-six hours. It is supposed to effect its results by exhausting the nervous energy of the spinal cord, and voluntary muscles. It is used for promoting sleep, and will be found extremely useful in allaying excessive action of the heart in hypertrophy of this organ; a pill of one or two grains of the extract producing a calm, soothing influence, followed by a diminution or removal of the palpitation or augmented action. Indeed, all affections attended with an excited or excitable condition of the nervous and vascular systems, will be benefited by its use. I have used a preparation which I call the *Conium Mixture*, with much advantage in several diseases; it is prepared as follows: Take of Precipitated Carbonate of Iron ten drachms; inspissated juice of Conium five drachms; Tincture of Balsam Tolu six ounces; Oils of Cinnamon and Wintergreen, of each twelve drops; White Sugar two ounces; Madeira Wine, Water, of each half a pint. Mix together, in a week the mixture will be ready for use. In dyspepsia attended with irritation of the stomach, pyrosis, or with an excitable state of the system from debility, this mixture will be found very beneficial; it may be given in doses of from a drachm to half an ounce, from three to six times a day before eating. Laxatives should be occasionally employed. In cough, conium will be found of much utility; I have used the following preparation in the cough attending phthisis, also in other coughs, with benefit: Take of Tincture of Cyanuret of Potassium, (made by adding twenty-two grains of the Cyanuret to nine fluidounces of Proof Alcohol,) six drachms; Conium Mixture three ounces; Tincture of Opium four drachms. Mix. Dose half a drachm to a drachm, three or four times a day. In intermittent fever I have frequently derived a happy effect from the following pill, when quinia alone failed; Take of sulphate of quinia ten grains; inspissated juice of conium

fifteen grains. Mix, and divide into twenty pills, of which one pill may be given every hour or two, until the effects of the conium have commenced, after which give one pill every four or five hours, according to its influence. In consequence of the action of conium on the spinal marrow it lessens the venereal appetite. It likewise lessens the secretion of milk. In the neuralgic pains attending carcinomatous affections it usually gives relief; sometimes, however, it has exerted no influence whatever, in palliating them. In scrofula, goitre, and indeed in all tuberculous affections, it will be found very effectual given in combination with the iodide of iron. It enters into the Compound Plaster of Belladonna, an excellent preparation, which I have been in the habit of using for many years. The leaves have likewise been employed externally as a poultice to painful tumors, ulcers, neuralgic and rheumatic pains, etc. The aqueous extract of this plant is worthless; the inspissated juice, or the ethereal extract, are alone valuable. A strong solution of the inspissated juice, or the juice of the fresh leaves, coated over the parts daily, for five or six days, will cure the itch. Dose of the leaves and inspissated juice, from one to three grains, three or four times a day; of the ethereal extract, which is an elegant extract of a rich dark-green color, from one-eighth of a grain to one-half of a grain. Conia, the active principle, is not used in medicine.

The *Cicuta Maculata*, Water Hemlock, is seldom used, being superseded by the Conium, which is deemed the safer article.

Off. Prep.—Extractum Conii Alcoholicum; Emplastrum Belladonnæ Compositum; Unguentum Conii.

CONVALLARIA MULTIFLORA. (*Polygonatum Multiflorum*. Desfontaines.)

Giant Solomon's Seal.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE ROOT.

Description.—This plant has a perennial root with a terete, recurved, smooth stem, growing from one to four feet high; the leaves alternate, distichous, lanceolate, amplexicaul, smooth and glossy above, paler and generally pubescent beneath, from two and a half to six inches long, by one to two and a half broad. Flowers five to eight lines long, pendulous, greenish-white, subcylindric. Peduncles axillary, filiform, branching, scarcely a fifth as long as the leaves, and from one to six-flowered. Berry globose, three-celled, dark-blue or blackish when ripe; cells two-seeded.

CONVALLARIA RACEMOSA, the *Smilacina Racemosa* of Desfontaines, has a thick rhizoma, sweet to the taste, with a stem from one to two feet high, downy, and recurved at top. The leaves are from four to six inches long, and about one-third as broad, oval, acuminate, veined, minutely pubescent, on petioles not exceeding two lines in length, and often sessile. The flowers are very numerous, small, white, on white pedicels, and with white, exserted, tapering filaments, constituting a large, compound, terminal raceme. Berry three-celled, pale-red, speckled with purple, aromatic.

History.—These plants grow on the sides of meadows, high banks, woods, and mountains, in various parts of the United States, especially in the northern and eastern States, and Canada, and are in blossom from May to August. The roots, which are the officinal parts, are inodorous, but of a sweetish, mucilaginous taste, followed by a slight degree of bitterness and acrimony. There are several varieties of this plant, some of which have been transferred to other families, as *Smilacina*, and *Polygonatum*, but the roots of which, probably, possess similar medical virtues. Although used with much benefit in many diseases by nearly all Eclectics, yet this plant has received but little attention as to its true therapeutical, as well as physical characteristics.

Properties and Uses.—Tonic, mucilaginous, and mildly astringent. Found of much value in leucorrhœa, menorrhagia, female debility, and pectoral affections. In piles, the root chewed and swallowed, or a decoction drank as freely as the stomach will bear, will be found to give prompt relief, or the root may be applied to the part, with a similar result. An infusion of the root will be found of great efficacy in irritable conditions of the intestines, as well as in chronic inflammations of these parts, especially when attended with burning sensations, pain, etc. In erysipelas, and cutaneous affections of an erysipelatous nature, as well as those maladies of the skin produced by the poison-vine, or resulting from the poisonous exhalations of other plants, the decoction of Solomon's Seal Root will afford direct relief, and an ultimate cure; it may also be applied externally, with advantage, to local inflammations. A large dose of the decoction will often provoke emesis or nausea, and act as a cathartic. Dose of the decoction, from one to four ounces, three times daily.

Off. Prep.—Decoctum Convallariæ; Vinum Symphyti Compositum.

CONVOLVULUS PANDURATUS.

Wild Potato.

Nat. Ord.—Convolvulacæ. *Sex. Syst.*—Pentandria Monogynia.

THE ROOT.

Description.—This plant, likewise known as *Wild Jalap*, *Man in the Ground*, *Mechameck*, *Man of the Earth*, etc., has a perennial, very large,

cylindrical or fusiform *root*, with a round, purplish, downy, procumbent, or climbing *stem*, several stems from the same root. The *leaves* are two or three inches long, and about the same width, broadly cordate at base, acuminate, entire, or undulate, alternate, sometimes panduriform, smooth, dark-green above, paler beneath, and on long petioles. The *flowers* are in fascicles of from two to five, opening in the forenoon, on axillary *peduncles*, longer than the petioles, generally branching at the top. *Corolla* large, two or three inches long, funnel-shaped, or campanulate, white, purplish-red toward the base or tube. *Calyx* smooth, five-parted, unequal, ovate-obtuse, two larger sepals external. *Stamens* white, the length of the tube; *anthers* oblong. *Style* white, filiform, with a bilobate stigma. *Capsule* oblong, two-celled, four-seeded, and without intermediate partitions.

History.—Wild Potato is indigenous to the United States, growing in light and sandy soils, from Connecticut and West New York, southward and westward, and flowering from June to August; it rarely grows north, but is found in some parts of South America. The root is the officinal part; it is very large being from two to eight feet in length, and from two to four or five inches in diameter, branched at the bottom, externally of a brownish-yellow color and full of longitudinal fissures, internally whitish and milky, of an unpleasant odor, and a bitter acrid taste. In drying, the root loses about three-fourths of its weight. As found in the shops the root is usually in circular pieces, of various sizes, being transverse sections, the color somewhat brown externally, and whitish within, with radiating striæ or lines. It pulverizes with difficulty the powder being light and gray. Water or alcohol extracts its active properties, but diluted alcohol or spirits are its best solvents. It contains resin, bitter-extractive, starch, gum, gallic acid, etc. Probably the active principle of this plant would prove more energetic than the crude root, and become a valuable agent.

Properties and Uses.—The real properties of this plant are unknown. It possesses feebly cathartic properties, acting gently in doses of from forty to sixty grains of the powdered root. The infusion, taken in wine-glassful doses every hour, has been effectual in dropsy, strangury and calculous affections. It seems to exert an influence over the lungs, liver, and kidneys, without excessive diuresis or catharsis. The saturated tincture is more energetic than the powdered root, decoction, or extract. It is asserted that the Indians can handle rattlesnakes with impunity, after wetting their hands with the milky juice of this root.

CONVOLVULUS SCAMMONIA.

Scammony.

Nat. Ord. — Convolvulaceæ. *Sex. Syst.* — Pentandria Monogynia.

THE CONCRETE JUICE OF THE ROOT—GUM RESIN.

Description.—This plant has a perennial, fleshy, fusiform *root*, from three to five feet long, and from three to five inches in diameter, branching toward its lower extremity, covered with a light-gray epidermis, and abounding in a milky juice. The *stems* are annual, numerous, slender, round, smooth, branching, twining, very slightly angular near the ends, and extending from twelve to twenty feet upon the ground, or on neighboring plants. The *leaves* are on long petioles, alternate, sagittate, oblong, acute, entire, quite smooth, truncate and angular at the base, with acute spreading lobes, and of a bright-green color. The *flowers* are pale-yellow, and are placed in pairs, or three together upon solitary, axillary and round peduncles, which are nearly twice the length of the leaf. *Sepals* five, rather lax, smooth, ovate, repand, obtuse with a reflexed point, colored at the edge. *Corolla* funnel-shaped, very much expanded, pale sulphur-yellow, thrice as long as the calyx, an inch or more in length; limb entire, somewhat reflexed. *Stamens* five, erect, converging, thrice as short as the corolla. *Ovary* two-celled, four-seeded, supporting a slender style as long as the stamens, with two linear-cylindrical, erect, oblong, parallel, distant and white stigmas. *Capsule* two-celled, with small pyramidal seeds.

History.—Scammony plant is a native of Turkey, Syria, Greece, Persia, etc., and somewhat resembles the *Convolvulus Panduratus*. The officinal portion is the concrete juice of the root, the other parts of the plant yielding no milky juice whatever. It is collected in the month of June, at which time the earth is cleared away from about the root, which is obliquely cut across near its crown, and a shell, or other convenient receptacle is fixed under the most depending part of the slope, into which the milky juice gradually flows. This soon concretes under exposure to the air and evaporation, forming the gum-resin of commerce, Scammony; of which but a few drachms are obtained from a single root. It is seldom had in a pure state, being more or less adulterated with flour, ashes, meal, chalk, sand, etc. It is imported directly from Smyrna, or from some of the Mediterranean ports. There were several varieties of scammony formerly known, as the Aleppo, Smyrna, and Montpelier, of which the first-named was the best, but, owing to the adulteration of the drug, it is impossible to keep up these distinctions any longer, and consequently the article is now recognized as *genuine* or *facitious* scammony.

Genuine Scammony, called *pure* or *virgin* Scammony, is ranked among the gum-resins, containing, however, but a small proportion of gum ; it is in irregular pieces, often covered with a whitish-gray powder, compact, light, very brittle, and easily pulverizable ; with a somewhat conchoidal, shining grayish-green fracture, soon passing to dark greenish-black, and exhibiting under the microscope minute air-cells and numerous gray semi-transparent splinters. It exhales a strong, peculiar odor, especially if breathed upon, and has a feeble taste when chewed, succeeded by acidity in the back of the throat. Its powder is of a pale ash-gray color. It is nearly wholly soluble in boiling alcohol, and sulphuric ether takes up from 77 to 83 per cent. of it. With water it forms a smooth emulsion, which is not permanent. Alcohol, however, is its best solvent. Analysis has detected in it a large proportion of resin, from 77 to 83 per cent., and small quantities of gum, fiber, sand, starch and water ; the starch is an accidental ingredient, probably derived from the root.

As found in the shops, scammony is in compressed circular cakes, sometimes flat on both sides, at others convex on one side, about five or six inches in diameter, from half an inch to two inches thick, of a dark-ash or slate color, somewhat lighter internally, but darkening on exposure to the air, of a smell similar to that of the genuine article, as well as the taste ; it is easily pulverized, affording a light-gray powder, and when triturated with water forms a greenish milky emulsion. These cakes are often broken and met with in fragments, with a faintly shining roughish fracture, hard, heavy, exhibiting a finely porous structure, and sometimes slightly translucent at the edges. This kind of scammony is always more or less adulterated with carbonate of lime, guaiacum, cowdung, starch, etc.

A *facititious* scammony called Montpellier Scammony is manufactured in the South of France from the expressed juice of the *Cynanchum Monspeliacum* mixed with various resins and other purgative substances. It has been sold as Smyrna scammony. It is in black, hard, compact, flat, semicircular cakes, about five or six inches in diameter, and half an inch or more in thickness, of a somewhat shining and resinous fracture, a weak, balsamic, disagreeable odor, and a very bitter nauseous taste. When rubbed with the moistened finger, it becomes dark-gray, unctuous and tenacious. It is more irritating and less purgative than the other varieties. There are several other kinds of scammony occasionally met with, but which may be detected by the proper tests.

Pure scammony may be known by being light, of a glistening almost resinous fracture if it be old and dry, friable, always of a brownish-gray color, and not subject to the results of the tests given below for detecting its adulterations. Sulphuric ether separates at least eighty per cent. of resin dried at 280°.

Pure scammony may be obtained by boiling the finely-powdered article of commerce in successive portions of proof spirit, till the spirit ceases to dissolve anything; filter, and distil the liquid until little but water passes over. Then pour away the watery solution from the resin at the bottom; agitate the resin with successive portions of boiling water till it is well washed, and finally dry it at a temperature not exceeding 240°. This separates the active matter of scammony from its impurities, and is called the *Extract of Scammony*. It forms with unskimmed milk, a uniform emulsion, scarcely distinguished from rich milk itself.

The addition of *carbonate of lime* as an adulteration, may be detected by its effervescing with muriatic acid; *starch*, may be known by the tincture of iodine forming a blue precipitate with an aqueous solution of the drug; *guaiacum*, may be detected by an application of some of the tincture of the suspected article on the fresh-cut surface of a raw potato; if guaiacum be present, it turns it quickly to a bright blue color.

Colophony may be detected in the resin of scammony, by the oil of turpentine, which dissolves it at common temperatures, leaving the scammony resin almost wholly unacted upon. But the best reagent for this purpose is sulphuric acid, which possesses the property of dissolving many resins, and of modifying, more or less, their composition. If a little of this acid be poured over colophony, it *immediately*, and by simple contact, develops an intense red color. The same acid, when poured over pure resin of scammony, produces, on the contrary, no immediate change; it is only, after the lapse of some minutes, and with contact of the air, that it becomes colored, and then but slightly, the color being wine dregs. For this purpose, four or five grains of the resin may be placed into a glass or porcelain mortar; and sixty or eighty grains of the sulphuric acid of commerce added. Upon rubbing it with the pestle, it will become red at once, if colophony be present. This method will detect the one-twentieth part of the adulteration.

Properties and Uses.—Scammony is a powerful, drastic cathartic, operating with harshness and griping. It was a favorite internal and external remedy with the Arabians. It does not appear to be poisonous even in large doses, but is seldom used alone, except in cases where a powerful impression upon the bowels is desired; most commonly it is combined with other cathartics, whose action it promotes, while its own harshness is diminished. Scammony is usually given in the form of an emulsion with sugar or sweet almonds. But when triturated with milk it is considered a superior preparation, as follows: Seven grains of pure scammony to be gradually triturated with three ounces of unskimmed milk, to which a few grains of ginger may be added, forms a safe purgative. Another form of using this gum-resin, is that of biscuit. A paste is made of scammony one drachm; Venice soap,

five grains; sugar nine grains; biscuit in powder one ounce, and a few drops of water. Mix together, divide into two biscuits, and let them dry; one biscuit acts energetically. The dose of powdered scammony is from five to fifteen grains; of the pure resin, one half this quantity. Its use is always contra-indicated by intestinal inflammation.

Off. Prep.—Pilulæ Podophyllini Compositæ. Pilulæ Gambogiæ Compositæ.

COPAIFERA OFFICINALIS.

Official Copaiba tree.

Nat. Ord.—Fabaceæ, *Jussieu*, or Amyridaceæ *Lindley*. *Sex. Syst.*—Decandria Monogynia.

THE OLEO-RESINOUS JUICE.

Description.—Copaifera Officinalis, the *Copaifera Jacquinii*, of Desfontaines, is a large and handsome tree, with a lofty stem, numerous, crooked and small branches at the top, a nearly smooth, brownish-gray bark, and crowned by a thick canopy of foliage. The leaves are alternate, large, equally pinnated, and composed of from two to five pairs of ovate-lanceolate, smooth, entire, incurved, inequilateral, coriaceous leaflets, two or three inches in length, pellucidly punctate, somewhat shining and on short petioles. The flowers are white, almost sessile, and are in axillary panicles at the ends of the branches, and divided into about eight alternate common peduncles. The calyx is composed of four oblong, acute, spreading, concave sepals, somewhat united at base, and tomentose within. The petals are wanting. The stamens are filiform, incurved, somewhat longer than the sepals, and bearing oblong, incumbent anthers. The ovary is roundish, compressed and hairy, crowned with a thin incurved style furnished with an obtuse stigma. The legume is ovate, subcompressed and coriaceous, containing a single elliptical seed.

History.—There are several species of the Copaiba tree, which furnish the oleo-resin copaiba. For a long time it was supposed to be the product of but one tree, but the researches of Martius, Hayne, and others, have shown that the species are numerous, and that, probably, several of them contribute to furnish the copaiba of commerce. Beside the one described above, are the *C. Guaianensis*, *C. Langsdorffii*, *C. Coriacea*, *C. Beyrichii*, *C. Martii*, *C. Bijuga*, *C. Nitida*, *C. Laxa*, *C. Cordifolia*, *C. Jussieui*, *C. Sellowii*, *C. Oblongifolia*, and *C. Multijuga*. These trees are all peculiar to South America, growing in Brazil, the West Indies, and other parts. It is principally collected in the provinces of Para and Maranhão, in Brazil, the trees of which yield the finer qualities of juice. It is imported from Para, and other Brazilian ports, Cartagena, Maracaibo, etc., from each of which places it differs in quality.

The juice is obtained by deep incisions being made into the trunk or stems of the trees, during or immediately following the wet season; the balsam flows freely, being clear, colorless, and thin, but soon acquiring more consistency, and a yellowish tinge. The incisions either heal spontaneously, or are closed with either wax or clay. Sometimes the operation is performed two or more times annually, and some trees so abound in the juice as to yield twelve pounds in three hours. Although Copaiba differs much in its appearance, owing to its various botanical sources, yet but two kinds are usually distinguished in commerce; the Brazil, and the West Indian.

The *Brazil Copaiba*, which is the most common in use, is a clear, transparent fluid, rather thinner in consistence than new honey, of a pale wine-yellow color, of a peculiar, resinous, not unpleasant odor, and of a bitter, nauseous, somewhat acrid, aromatic, persistent taste. Its specific gravity varies from 950 to 1,000. When long kept, it becomes darker, more dense, and of greater consistency; and after some years its resin partly crystallizes in minute six-sided prisms. Water does not dissolve copaiba, but acquires its odor; it is moderately soluble in rectified spirit, and freely so in alcohol, fixed and volatile oils, and sulphuric ether. With the aid of heat it dissolves iodine and sulphur; sulphuric acid unites with it, rendering it reddish brown and thicker. Solution of potassa forms a soap with it; magnesia, and its carbonate are freely dissolved by it, especially with the aid of heat, producing a honey-like translucent mass which gradually hardens; carbonic acid is disengaged with the latter. Hydrate of lime causes a similar change. It is composed of volatile oil, resin, and a minute proportion of acid.

The *West Indian Copaiba* is of a thicker consistence than the above, likewise of a darker yellow color, turbid but translucent, of a less agreeable and more terebinthinate odor, and more bitter and acrid in taste. Neither of these varieties contain benzoic acid; hence the term *balsam*, as applied to copaiba, is incorrect.

The *volatile oil* constitutes from one-third to one-half or more of the copaiba, and is obtained by distillation. (*See Oleum Copaibæ.*) The *resinous matter* which remains after the oil has been separated, becomes hard and brittle in cold, but continues soft in warm weather, it is translucent, greenish-brown, nearly inodorous and tasteless. When treated with the oil of petroleum, it becomes separated into two distinct resins, one of which is dissolved, and may be obtained separate by evaporation, the other is left behind. The first is hard, brittle and yellowish, constituting the largest proportion of the resin of copaiba, is soluble in naphtha, alcohol, ether, fixed and volatile oils, possesses acrid properties, and is termed *Copaivic acid*. The second resin is soft, brown, unctuous, possesses no acid reaction, and is insoluble in naphtha.

Copaiba, especially in the European markets, is often adulterated with oil of turpentine, or fixed oils. If turpentine, or other volatile oil be

present even in small proportion, it may be detected by its odor on the application of gentle heat. Any fixed oil except castor oil, may be discovered by agitation with absolute alcohol, giving a turbid, instead of a clear and permanent solution, from which the impurity slowly separates. Carbonate of magnesia added to the suspected article, and a gentle heat applied, is a better test for all fixed oils. Pure copaiba dissolves one-fourth of its weight of the carbonate, and remains translucent; but a small proportion of any fixed oil renders the product opake.

Various plans have been proposed for ascertaining the presence of castor oil. The simplest is to boil one drachm of the copaiba in a pint of water till the liquid is wholly evaporated. If the copaiba contain a fixed oil, the residue will be more or less soft according to the quantity present; otherwise it will be hard. Another mode, proposed by M. Planche, consists in shaking together in a bottle one part of aqua ammoniæ of the sp. gr. 0.9212 (22° Baumé) with two and a half parts of copaiba, at a temperature of from 50° to 60° F. The mixture, at first cloudy, quickly becomes transparent if the copaiba is pure, but remains more or less opake if it is adulterated with castor oil; this test, however, is said to fail in some varieties of the genuine article. If pure copaiba be triturated with sulphuric acid, it reddens it, but does not alter its color if any fixed oil be present. All these tests, however, when taken singly, are open to sources of fallacy, and the best method of determining the purity of the article, is to ascertain the quantity of volatile oil it affords by distillation. Recent copaiba examined by Gerber yielded 41 per cent. of volatile oil, 51.38 of the hard and brittle resin, 2.18 of the soft resin, and 5.44 of water; while an older specimen gave 31.07 per cent. of oil, 53.68 of hard resin, 11.15 of soft resin, and 4.10 of water.

Properties and Uses.—When given in large doses, copaiba is an irritant; in medicinal doses it is stimulant, cathartic, and diuretic; it likewise exerts an especial influence on the mucous tissues of the system, diminishing their secretions when excessive, and for this latter purpose it is principally employed. When swallowed, it causes a sensation of heat in the throat and stomach, and exerts an influence throughout the alimentary canal, the urinary passages, and upon all the mucous membranes. In the course of its action it becomes absorbed, so that its odor and bitter taste are communicated to the urine, while the former can also be detected in the breath. Among the inconveniences attending its use, especially when used in large doses, the most frequent are nausea and vomiting, occasionally painful purgation, bloody urine, and febrile symptoms; these effects may be obviated very often, by administering the remedy oftener, but in smaller doses, and by combining it with cinnamon, nutmeg, or some other aromatic. It likewise frequently produces a transient papular eruption on the skin, resembling that of measles, and accompanied with a disagreeable itching and tingling. It

has been found most beneficial in chronic mucous affections, as in chronic gonorrhea, bronchitis, irritable conditions of the bladder, gleet, leucorrhea, chronic catarrh, chronic dysentery, and painful hemorrhoidal affections. Its effects in gonorrhea are much increased by the addition of liquor potassa; and it is much more beneficial in the gonorrhea of males than of females, because, in the latter, the vagina is oftener affected than the urethra. In injection, it has been used with good results; make an emulsion of two drachms of copaiba with the yolk of an egg, add twenty or thirty drops of laudanum to it, in order to prevent its too speedy discharge from the rectum, and eight fluidounces of water. This may be used as an injection, and repeated three or four times a day. Locally, it forms an excellent application to chilblains, old ulcers, and fistulous ulcers, in which it serves to speedily soften the callosity of the walls of the fistulous canal. The dose of copaiba is from twenty to sixty drops, two or three times a day. It may be taken in emulsion, made by triturating each dose with the yolk of one egg, adding half an ounce of mint, cinnamon, or other aromatic water, and sweetening with sugar; or it may be taken in the form of pill with magnesia; the best and least objectionable form in which it can be taken is in the form of capsules. (*See Article "Glue."*) The oil is the best form for obtaining the effects of the copaiba, *which see*.

Off. Prep.—Mistura Copaibæ Composita; Oleum Copaibæ; Pilulæ Copaibæ Compositæ; Pilulæ Copaibæ.

COPTIS TRIFOLIA.

Gold Thread.

Nat. Ord.—Ranunculacææ. *Sex. Syst.*—Polyandria Polygynia.

THE ROOT.

Description.—This plant, also termed *Mouthroot*, has a small and creeping, perennial root, of a bright-yellow color; the *stems* are round, slender, and furnished at the base with a number of ovate, acuminate, yellowish, imbricated scales. The *leaves* are evergreen, radical, ternate, on long, slender petioles; the *leaflets* are rounded or obovate, sessile, acute at base, smooth, firm, much veined, with a lobed and acuminately crenate margin. The *scape* or *flower-stem* is slender, round, rather longer than the leaves, bearing one small, starry, white flower, with a minute, mucronated bract at some distance below. The *corolla* has from five to seven white, oblong, concave, nectariform petals; the nectaries inversely conical, hollow, and yellow at the top. The *calyx* is from five to seven-sepalled; sepals oblong, concave, white. The *stamens* are numerous, white, with capillary filaments, and adnate, globose anthers. The *ovaries* are from five to eight, stipitate, oblong, compressed; *styles* short and recurved, with acute stigmas. *Capsules*

stalked, oblong, rostrate, compressed, on long divaricate pedicels, and containing many small, black, oval seeds attached to the inner side.

History.—Goldthread is found growing in the northern parts of the United States, and in Canada, Greenland, Iceland, and Siberia; it grows in dark shady swamps and boggy woods, flowering from early in the spring to July. The root, as found in the shops, is in loosely-matted masses, consisting of long, thread-like, orange-yellow roots, frequently mixed with the leaves and stems of the plant; it is inodorous, of a pure bitter taste, without aroma or astringency. They should be gathered in autumn, and carefully dried. Its properties are imparted to water, but more perfectly to alcohol, and the solutions are precipitated by nitrate of silver, and acetate of lead. It does not appear to contain resin, gum, or tannin, its virtues depending, probably, on a bitter extractive substance.

Properties and Uses.—Goldthread is a pure and powerful bitter tonic, somewhat resembling quassia, gentian, and colombo, without any astringency. It may be beneficially used in all cases where a bitter tonic is admissible, and is decidedly efficacious, as a wash or gargle, when in decoction, in aphthous and other ulcerations of the mouth. In dyspepsia, and in chronic inflammation of the stomach, equal parts of goldthread and golden-seal made into a decoction, with elixir vitriol added in proper quantity, will not only prove effectual, but in many instances of the latter kind, will permanently destroy the appetite for alcoholic beverages. Dose of the powder or tincture from half a drachm to a drachm; of the decoction, from two to six fluidrachms; the tincture made by adding an ounce of the powdered root to a pint of diluted alcohol is preferable to the powder.

Off. Prep.—Decoctum Coptis.

CORIANDRUM SATIVUM.

Coriander.

Nat. Ord.—Apiaceæ. *Ser. Syst.*—Pentandria Digynia.

THE FRUIT.

Description.—This is an annual plant with a tapering root, and an erect, round, smooth, more or less branching, striated stem, growing from one to two feet high. The leaves are compound, the lower ones pinnate, on long slender petioles, their leaflets wedge-shaped or fan-shaped, and acutely-notched, somewhat resembling those of common parsley; the upper ones thrice ternate, with five linear-pointed leaflets. The flowers are white, often with a reddish tint, and are disposed in compound, terminal, stalked umbels, of rarely more than four or five rays; the partial rays more numerous. Calyx five-toothed, acute, unequal, permanent. Petals obovate, emarginate, with inflexed lobes, the

exterior radiating and bifid. The *fruit* is spherical, a line and a half in diameter, somewhat coriaceous, carminative and aromatic. *Seed* excavated in front, with a loose skin.

History.—Coriander is a native of Italy, but found growing wild in most parts of Europe. It flowers in June, and the fruit ripens in August. When bruised, all parts of the fresh plant are extremely fetid, resembling the odor of bugs, while the fruit, which is the official portion, becomes fragrant by drying; the smell and taste being gratefully aromatic, and which is owing to a volatile oil, which may be obtained by distillation. As found in the shops, the fruit is globular, about the eighth of an inch in diameter, obscurely ribbed, of a grayish or brownish yellow color, and separable into two portions, or half fruits. Its virtues are imparted to alcohol, and partially to water.

Properties and Uses.—Stimulant and carminative. Used principally to cover the taste of other medicines, or to correct their nauseous or griping qualities. Dose, from a scruple to a drachm.

Off. Prep.—Confectio Sennæ.

CORNU CERVINÆ CALCINATUM.

Calcined Deer's Horn.

Preparation.—Take the horns of the deer—*Cervus Virginianus*—any time from the months of August to December, or while they are *in velvet*, (until just before they fall off,) and when dry rasp them to a coarse powder. Place this in an iron vessel, cover it up tightly, and put it in an oven, or other situation, where a heat, not equal to boiling water, say 195° or 200°, can be continuously maintained for forty-eight hours, or until the whole becomes of a light-brown color, like roasted coffee, and is readily pulverizable, then, when cool, pulverize it, and keep it in well-stopped bottles. During the application of the heat, which should be gradual, the powder should be constantly agitated, on which account, a vessel similar to a coffee roaster would be a very suitable one in which to calcine it. The powder, thus prepared, is of a light chocolate, or yellowish-brown color, of a peculiar, slightly aromatic, animal charcoal odor, and a very faintly-astringent taste. Horns which have fallen from the deer will not answer.

Properties and Uses.—A powerful styptic. Especially an Eclectic remedy, of much value in uterine hemorrhage and menorrhagia. Has also been found beneficial in dysentery, hemoptysis and other hemorrhages. Dose of the powder one drachm, every half hour until the hemorrhage ceases permanently, which is usually from the first to the third or fourth dose; or one drachm of the powder may be placed in a gill of hot water, and a tablespoonful of the infusion be given every five or ten minutes. This has been tested in numerous cases, and as yet, no failure has been heard of. It is often given combined with the compound

powder of ipecacuanha and opium, or with other agents, as capsicum and opium, etc.

CORNUS CIRCINATA.

Round-leaved Dogwood.

Nat. Ord.—Cornaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE BARK.

Description.—This plant, likewise called *Broad-leaved Dogwood*, *Alder-leaved Dogwood*, *Round-leaved Cornel*, etc., is a shrub growing from six to ten feet high, with straight, slender, greenish and verrucose branches. The leaves are large, about as broad as long, orbicular, or very broadly oval, opposite, acuminate, waved on their edges, somewhat rough above, but lanuginous beneath. The flowers are white, in small, spreading, depressed cymes, without an involucre. The fruit or berries are a bright blue, becoming lighter colored as they mature, small, soft, hollowed at base, and crowned with the persistent style.

History.—This plant is a native of the United States, growing from Canada to Virginia, on hill-sides and the banks of rivers, and flowering in June and July. The dried bark is usually in quills of a whitish or ash-color, and affords a gray powder, somewhat resembling that of ipecacuanha. Its odor is slight, and its taste bitter, astringent, and somewhat aromatic. It imparts its virtues to water, and in chemical character, has thus far been found analogous with the *Cornus Florida*.

Properties and Uses.—An astringent tonic, which may be employed in all cases where such agents are indicated. An infusion of it may be made by infusing an ounce of the coarsely-powdered bark in a pint of boiling water, and may be given in doses of one or two fluidounces, several times a day; it is useful in diarrhea and dysentery, and also as a gargle in sore-throat. One ounce of the bark affords 150 grains of an astringent, intensely bitter extract, which may be used with benefit. The medical virtues of this plant are similar to those of the *Cornus Florida*, as well as its doses.

CORNUS FLORIDA.

Dogwood.

Nat. Ord.—Cornaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE BARK.

Description.—This plant, also known as *Boxwood*, *Flowering Cornel*, etc., is a small indigenous tree, from twelve to thirty feet high, with a very hard and compact wood, covered with a rough, dark-brown bark, much fissured. It is a tree of slow growth. The branches are opposite, spreading, smooth, covered with a reddish bark, and marked with rings at the place of the former leaves. The leaves are opposite, but partially

expanded at the flowering time, ovate, acute, entire, petiolate, nearly smooth, dark-green and sulcated above, paler beneath and marked with strong parallel veins, also glaucous or whitish beneath; toward the close of summer, they are speckled with black spots, and on the approach of cold weather assume a red color. The *flowers* are very small, of a greenish-yellow color, in heads or sessile umbels, upon peduncles an inch or more in length, surrounded by a large involucre of a white or pinkish color, constituting the chief beauty of the tree when in flower. *Involucre* composed of four white, nerved, obovate leaves, having their point turned abruptly down or up, so as to give them an obcordate appearance. *Calyx* superior, campanulate, with four obtuse, spreading teeth. The *corolla* is composed of four oblong, obtuse, reflexed petals. *Stamens* four, erect; *anthers* oblong, with the filaments inserted in their middle. *Style* shorter than the stamens, erect, bearing an obtuse stigma. *Fruit* an oval drupe of a glossy scarlet color, containing a nut or nucleus with two cells and two seeds.

History.—*Cornus Florida* is found in all parts of the United States, but more abundantly in the middle States; it flowers from February to June, according to the climate, but always about the time for planting Indian corn, and ripens its fruit in the fall. The wood is susceptible of a high polish, and may be used for a variety of purposes where strength and hardness are required; the sap is white, and the heart chocolate-color. The young branches, deprived of the bark, and the ends chewed or pounded, so as to separate the fibers, are often used for cleaning the teeth, which they render very white. The bark of the stem, branches, and root, is the officinal part; that from the root is to be preferred. It is found in the shops in pieces of various sizes, more or less rolled, sometimes having a fawn-colored epidermis, at other times partially or wholly deprived of it, of a reddish-gray color, very brittle, and affording, when pulverized, a grayish powder tinged with red. The odor is feeble, its taste bitter, astringent, and slightly aromatic. Water or alcohol extracts its virtues. Analysis has detected in it tannin, gallic acid, a bitter extractive, resin, gum, a crystalline substance, etc.

Mr. W. S. Merrell prepares an article from dogwood which he terms *Cornine*, and supposes it to be, *probably*, a mixture of resin and insoluble alkaloid. It is prepared by precipitating from the tincture with water, after distilling off the alcohol, in the same manner as podophyllin is prepared. It is a light grayish-brown substance of a peculiar odor, slightly bitter and astringent taste, changed to a dark-brownish red by the action of sulphuric acid, brownish-yellow by nitric acid, and unchanged by muriatic acid. It is insoluble in water, in diluted mineral acids, in volatile oils and spirits of turpentine. Ammonia renders it partially soluble in water; liquor potassa diluted causes a dark wine-colored solution, with a precipitate which dissolves in alcohol, and ether. Chloroform becomes colored by it, the cornine floating on its surface. Alcohol

almost wholly dissolves it, and ammonia renders the solution complete. It is soluble in ether, and ammonia added removes the cornine in solution, leaving the ether floating clear and transparent. Liquor potassa added to the ethereal solution does not completely remove the cornine, and causes a precipitate which floats between the two liquids when they separate. An article termed *Cornine* is prepared in New York, but as we have never seen it, nor met with any account of its mode of preparation, we can merely refer to the fact, with this remark, that no practitioner should use any agent whatever, the mode of preparing which is kept a secret from the profession; as well may we employ all the patent medicines so highly lauded by their originators.

Properties and Uses.—Dogwood bark is tonic, astringent, and slightly stimulant; it is, probably, the best native substitute we have for the cinchona, having often succeeded in preventing the return of paroxysmal fevers, where the foreign drug proved ineffectual. It may be used in all cases where quinia is indicated and cannot be administered, owing to idiosyncrasy, etc., or where it cannot be obtained pure. It may be used with advantage in all cases where tonics are required, in periodical fevers, typhoid fevers, etc. Its internal employment increases the force and frequency of the pulse, and elevates the temperature of the body. It should be used in the dried state, as the recent bark is apt to disorder the stomach, and produce pains in the bowels, but which may be relieved by a few drops of laudanum. The *cornine* prepared by Mr. Merrell is much used as a substitute for quinia, by Eclectics, and is frequently preferred by them to the alkaloidal salt. It may be variously combined with xanthoxylum, myricin, salicin, hydrastin, podophyllin, or hydro-alcoholic extract of cimicifuga, in the different affections for which it is administered. An extract of the bark prepared by boiling it in water, and evaporating to the proper consistence, will be found the best form in which to administer it. Dose of the powdered bark, from twenty to sixty grains, as often as required; of the extract from five to ten grains; of cornine from one to ten grains or more. The ripe berries, infused in brandy, are used in some sections of country as bitters; and an infusion of the flowers forms a good substitute for chamomile-flower tea.

Off. Prep.—Cornine; Decoctum Cornûs Floridæ; Extractum Cornûs Floridæ; Extractum Cornûs Floridæ Fluidum; Pilulæ Quiniæ Compositæ.

CORNUS SERICEA.

Swamp Dogwood.

Nat. Ord.—Cornaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE BARK.

Description.—The *Cornus Sericea*, known likewise by the names of *Rose-willow*, *Red-osier*, *Silky Cornel*, *Red-willow*, etc., is a shrub from

six to ten feet high, with numerous erect *stems*, which are covered with a greenish, or brownish-purple bark, of a brighter color on the younger shoots, and sending out opposite, spreading branches, with pubescent twigs. The *leaves* are pale-green, opposite, from two to four inches long, half as wide, ovate and acuminate, sometimes almost lanceolate, at others broadly ovate, petiolate, entire, nearly smooth above, with rather prominent veins, covered beneath with a soft, whitish, or rust-colored pubescence. The *flowers* are yellowish-white, small, and disposed in large, terminal cymes, which are depressed and woolly. *Calyx-teeth* lanceolate; *stigma* thick and capitate. The *fruit* consists of globular, berry-formed drupes, collected in bunches, of a beautiful blue color; *stone* compressed.

History.—Swamp Dogwood is found in wet thickets, and on the margins of water-courses, from Canada to Carolina, flowering in June and July. The bark is the officinal part, that of the root being preferred; it possesses similar properties with the *Cornus Florida*.

Properties and Uses.—Similar to the *C. Florida*, being however more astringent and less bitter. It has been found useful in dyspepsia and diarrhea, and may be employed as a substitute for the *C. Florida* in the same doses, and administered in a similar manner. An infusion is very valuable in checking vomiting, especially that arising from pregnancy and diseased uterus. It has also been highly recommended in dropsy, ulcers, malignant fevers, and as an antiseptic.

CORYDALIS FORMOSA. (*Dielytra Formosa*.)

Turkey Corn.

Nat. Ord.—Fumariaceæ. *Sex. Syst.*—Diadelphia Pentandria.

THE ROOT.

Description.—This plant, likewise known as *Wild Turkey-pea*, *Stagger-weed*, *Choice Dielytra*, is an indigenous perennial plant, rising from six to ten inches in height, and having a tuberous root. The *leaves* are radical, rising from ten to fifteen inches high, somewhat triternate, with incisely pinnatifid segments, but quite variable. The *scape* is naked, and rises from eight to twelve inches in height, with from four to eight cymes, each with from six to ten reddish-purple, nodding *flowers*; *racemes* compound, the branches cymose; *corolla* from eight to ten lines long, broad at base; *nectaries* or *spurs* very short, obtuse, incurved; *bracts* purplish, at base of pedicels; *style* extended; *stigma*, two-horned at apex; *sepals* two, deciduous; *capsule* pod-shaped, many seeded.

History.—This beautiful little plant was introduced to the profession by Professor Jones. It flowers very early in the spring, in this section

of the country as early as March ; and the root or tuber, which is a small round ball, should be collected only while the plant is in flower. It grows in rich soil, on hills and mountains, among rocks, and old, decayed timber, and is found westward, and south of New York to N. Carolina.

It must be distinguished from the *Corydalis Cucullaria*, which flowers at the same time, and very much resembles it. The root or bulb of the *C. formosa*, when fresh, is of a darkish-yellow color throughout, while the *C. cucullaria* has a black cortex or rind, and is white internally. When dried the external covering of the root is of a light grayish-yellow color, about the fourth of a line thick, inclosing an internal, light-yellow substance ; frequently it is of a dark color externally, and when examined under a microscope, full of pores, and internally, yellow or brownish-yellow. It has a faint, peculiar odor, and a taste at first slightly bitter, succeeded by one somewhat penetrating, peculiar and persistent, gently influencing the fauces, and increasing the flow of saliva. The cause of the difference of appearance in drying is not known, unless it be owing to the difference in the age of the root. Microscopic examination of the lighter variety gives a porous, spongy, resinous, glistening fracture ; and of the darker, a fracture very much resembling honeycomb. Water or alcohol extracts its virtues. It has not been analyzed, though it contains an alkaloid principle named *Corydalia*. I called the attention of Eclectics to this principle in the U. S. Eclectic Dispensatory, as *corydalin*, not having submitted it to any chemical tests, since which, Mr. W. S. Merrell has manufactured it for the profession, and ascertained its alkaline character. When in powder, corydalia is of a greenish-brown color, insoluble in water, partially soluble in ether, and completely so in alcohol. Diluted muriatic and sulphuric acids dissolve it. Nitric acid reddens it, and it forms crystallizable salts with acetic and sulphuric acids. It is of a peculiar, slightly aloetic odor, of a weak bitter, sub-acrid, and nauseous taste, and rather tenacious. Four pounds of the *Corydalis* root, yields little more than an ounce of this alkaloid. It is obtained by adding water to the tincture of the root, a portion of the alkaloid is precipitated ; filter the supernatant liquid, and add to it ammonia, which causes another precipitate of the alkaloid ; again filter the supernatant liquid, and add to it muriatic acid, when the balance of the alkaloid remaining in the solution is precipitated. Probably it may be obtained by adding muriatic acid to a strong infusion of the root and precipitating with ammonia.

Properties and Uses.—This agent is peculiar to Eclectics, not being known by any other class of practitioners. It is tonic, diuretic, and alterative. In all syphilitic affections, it is one of the best remedies we have ; and will likewise be found valuable in scrofula, and in all

cases where tonics are indicated. As a tonic, it possesses properties similar to the Gentian, Colombo, or other pure bitters; its alterative properties, however, render it of immense value. In syphilis it seems to be possessed of magical powers. The *corydalia* possesses all the alterative properties of the bulb in an eminent degree, and will be found useful in all scrofulous and syphilitic affections, as well as in many cutaneous diseases.

Dose of the infusion, from one to four fluidounces, three or four times a day; of the saturated tincture, from half a fluidrachm to two fluidrachms; of *corydalia*, from one half of a grain to one grain, three or four times a day. The infusion to be made by adding four drachms of the powdered bulb to one pint of boiling water.

Corydalia may be advantageously combined with berberin, hydrastin, ptelein, etc., as a tonic, and with podophyllin, xanthoxylin, stillingin, iridin, and phytolaccin, etc., as an alterative.

Off. Prep.—*Corydalia*; Decoctum *Corydalis*; Extractum *Corydalis* Hydro-alcoholicum; Syrupus *Stillingiæ Compositus*; Syrupus *Corydalis Compositus*; Tinctura *Corydalis*.

CREASOTUM

Creosote.

A PECULIAR SUBSTANCE OBTAINED FROM TAR.

Preparation.—Creosote is obtained either from tar or from crude pyroligneous acid. When tar is used, it is distilled until it has attained the consistence of pitch. The distilled liquid divides itself into three layers, an aqueous between two oily layers. The inferior oily layer, which alone contains the creosote, is separated, and saturated with carbonate of potassa, to remove acetic acid. The liquid is allowed to rest, and the new oil which separates is decanted from it. This oil is distilled, and yields products lighter than water, and a liquid heavier. The latter alone is preserved, and having been agitated repeatedly with weak phosphoric acid, to neutralize ammonia, is allowed to remain at rest for some time. It is next washed as long as acidity remains, and then distilled with a fresh portion of weak phosphoric acid, care being taken to cohobate from time to time. The oily liquid thus rectified is colorless, and contains much creosote, but also a portion of eupione. To separate these, the liquid is mixed with a solution of caustic potassa, of the density of 1.12, which dissolves the creosote, but not the eupione. The eupione, which swims above from its levity, being separated, the alkaline solution of the creosote is exposed to the air until it becomes brown in consequence of the destruction of a foreign matter, and is then saturated with sulphuric acid. This sets free the creosote, which is decanted, and again distilled. The treatment by solution of potassa, sulphuric acid, etc., is to be repeated until the

creosote no longer becomes brown by exposure to the air, but only slightly reddish. It is then dissolved in a stronger solution of potassa, and distilled again, and finally re-distilled for the last time, rejecting the first portion, which comes over on account of containing much water, collecting the next portions, and avoiding to push the distillation too far. The product collected in this distillation is pure creosote. When creosote is extracted from pyroligneous acid, the first step is to dissolve sulphate of soda in it to saturation. The oil which separates and swims above is decanted, and having been allowed to remain at rest for a few days, is saturated by carbonate of potassa, with the assistance of heat, and distilled with water. The oleaginous liquid obtained is of a pale-yellow color, and is to be treated with phosphoric acid, etc., etc., as above detailed with respect to the treatment of the corresponding oil obtained from tar.

Creosote is a colorless oleaginous liquid, or as found in the shops, with a brownish tinge, of the consistence of oil of almonds, slightly greasy to the touch, and having a caustic and burning taste, and a penetrating, disagreeable odor, like that of smoked meat. It burns with a sooty flame. Applied to the skin in a concentrated state, it quickly destroys the cuticle. On paper it leaves a greasy stain, which disappears in a few hours, or very rapidly when exposed to a gentle heat. Its sp. gr. is 1.037. It boils at 397° , and retains its fluidity at -17° , and not at so low a temperature as -50° , as erroneously stated in the London Pharmacopœia. It is a non-conductor of electricity, and refracts light powerfully. It is devoid of acid or alkaline reaction. Mixed with water, it forms two combinations—one a solution of 1 part of creosote with about 80 of water, the other of 1 part of water in 10 of creosote. It unites in all proportions with alcohol, ether and naphtha. It is capable of dissolving a large quantity of iodine and phosphorus, and a considerable portion of sulphur, especially when assisted by heat. With potassa, creosote forms two combinations; one anhydrous, of an oleaginous consistence; the other, hydrated, and in the form of small, white, pearly scales; with soda, it also forms similar compounds. It dissolves ammonia instantly, retaining it with great force. It is decomposed by strong nitric and sulphuric acids. Acetic acid dissolves it in all proportions. It acts powerfully in coagulating albumen. It preserves meats from putrefaction which have been dipped in a solution of it for fifteen minutes. It consists of 76.2 carbon, 7.8 hydrogen, and 16 oxygen.

It is sometimes rendered impure by the presence of eupione, picamar, or capnomer, and frequently rectified oil of tar, as well as fixed and volatile oils; these may be detected by strong acetic acid, which dissolves the creosote, and leaves the adulterations floating above the solution. Fixed oils are discovered by a stain on paper, not discharged by heat.

*1 ounce
80 parts of water
1 part of water
100 Ounces*

Properties and Uses.—Irritant, narcotic, styptic, antiseptic, and escharotic. Used in diabetes mellitus, epilepsy, hysteria, neuralgia, chronic catarrh, hemoptysis, hematemesis, chronic gonorrhea and gleet, and to arrest nausea or vomiting occasioned by hysteria or pregnancy. Externally, in which it is more commonly used, it has been found efficacious in scaly cutaneous affections, burns, external wounds, capillary hemorrhage, indolent and gangrenous ulcers, also, scrofulous, syphilitic and fistulous ulcers and scrofulous ophthalmia; as a gargle, in putrid sore-throat; as an injection, diluted with oil of almonds, in chronic suppuration of the external meatus of the ear, and in toothache, depending on exposure of the nerve. It should most usually be sufficiently diluted, and used in the form of mixture, solution or ointment. Dose, from one to three drops, diluted with two or three fluidounces of weak mucilage, three or four times a day. However, it is seldom used internally at the present day, the pyroligneous acid answering a much better purpose for internal administration. In an overdose, creosote acts as a poison, causing obscurity of vision, giddiness, depressed action of the heart, convulsions, and coma. The treatment must be the use of ammonia and other stimulants, with white of egg. Creosote water may be used with advantage as a preservative of anatomical preparations, without hardening them; and three or four drops of creosote to a pint of ink will prevent it from becoming moldy.

Off. Prep.—Unguentum Creasoti.

CRETA PRÆPARATA.

Prepared Chalk.

Preparation.—Rub Chalk (Carbonate of Lime) very fine, with a little water; stir this into a large quantity of water, and when the coarse particles have subsided, pour off the supernatant turbid liquor, into another vessel, and let it settle. Pour off the water, and dry the powder.

History.—Chalk has not been found in the United States, but is obtained in abundance in the south of England, and north of France. It occurs in the newest secondary strata, and constitutes with its subordinate rocks a distinct and peculiar formation. It is scarcely ever a perfectly pure carbonate of lime, always containing silica, alumina, iron, and fossil remains of land and marine animals. It is a carbonate of lime, and is identical with marble (*which see*) in its relations to water, air, alcohol, heat and acids.

It is termed in the U. States Dispensatory, *Native Friable Carbonate of Lime*. There are two kinds of it, Hard and Soft Chalk; the latter is commonly preferred for medical purposes, though the former may be employed as well. It has an earthy appearance, pure white when undulterated, grayish-white when impure, inodorous, tasteless, opaque,

insoluble, rough to the touch, very friable, breaking with an earthy fracture, and leaves a white mark when drawn across a resisting surface. Its specific gravity varies from 2.3 to 2.6. When pure, muriatic acid completely dissolves it; if the solution is precipitated by ammonia, it contains alumina if the precipitate be white, and oxide of iron if it be in yellow flakes. Chalk is unfit for medicinal use, until it has been divested of its gritty particles by levigation and elutriation, as above described. In this process, the coarser gritty particles become deposited, leaving the soft chalk floating in the liquor, which being poured off, the impalpable powder is collected as it slowly descends; after again pouring off the liquor, as soon as all the powder has subsided, the mass left behind, is made to fall in small portions upon an absorbent surface, and which when dried have a conical shape, and are termed *Prepared Chalk*.

Properties and Uses.—Antacid, astringent and absorbent. Used in acidity of the stomach and diarrhea, combined with aromatics and opium; externally, to ulcers and burns, to absorb the ichorous discharge, and to prevent excoriations from pressure or friction. Dose, from ten grains to one drachm.

Prepared oyster shell, *Testa Præparata*, has the same properties, but is now out of use; it is prepared by freeing the shells from extraneous matter, by washing with boiling water, then powdering and proceeding as above.

CROCUS SATIVUS.

Saffron.

Nat. Ord.—Iridaceæ. *Sex. Syst.*—Triandria Monogynia.

THE STIGMAS.

Description.—Saffron is a perennial plant, with a rounded and depressed *bulb* or *cormus*, the integuments of which consist of parallel fibers, which are distinct at the upper end. The *leaves* are radical, linear, long, placid, slightly revolute at the margins, dark-green upon their upper surface, with a white, longitudinal furrow in the center, paler underneath with a prominent, flattened midrib, and inclosed at their base, together with the tube of the corolla, in a long membranous sheath or bract, from which they emerge soon after the appearance of the flower. The *flowers* are large, of a beautiful lilac, or bluish-purple color, with a long, slender, campanulate white tube, axillary, striated, with a two-valved, membranous, thin, transparent, radical spathe, and appearing with the leaves. The *style* hangs out on one side between two segments of the corolla, and terminates in three long, deeply-divided, linear-cuneiform, emarginate, fragrant stigmas, of a deep orange color.

History.—Saffron is a native of Greece and Asia Minor, and is much cultivated in some parts of Europe. It is also cultivated as a garden

flower, in this country. It is liable to two diseases, which occasionally interfere with the success of its culture; one is owing to a parasitic fungus which adheres to the bulb; the other, called *tacon* by the French, converts the bulb into a blackish powder. Saffron flowers in the autumn, and perfects its seed the succeeding spring. It is propagated by offsets from the bulb. The part used in medicine is the stigmas; to obtain these, the flowers are gathered as soon as they unfold themselves, the stigmas are separated, and dried by an artificial heat. There are two kinds of it in commerce, called Hay and Cake Saffron. The *Hay Saffron*, which is the best kind, consists simply of the stigmata entangled together, and retaining their original deep orange color. The *Cake Saffron* is in flexible cakes, about half a line in thickness, and of a dirty, brownish-orange tint, made by beating the stigmata together before they are quite dry. Saffron has a powerful, aromatic, somewhat stupefying odor, and a bitterish, balsamic, rather acrid taste. It imparts its properties to water, vinegar or spirit. In choosing it, it should not be very moist nor very dry, nor easily pulverized, nor should it emit an offensive odor when thrown on hot coals. The freshest is the best, and should possess an oily feel, and color the fingers when rubbed between them. As its active principle is volatile, it should be kept in well-stopped vessels.

Saffron yields, on analysis, 7.5 per cent. of an odorous, volatile oil, wax, gum, albumen, saline matter, water, lignin, and 6.5 per cent. of a peculiar extractive matter, termed *polychroite*, on account of the changes of color it undergoes by the reaction of agents. It may be obtained by evaporating the watery infusion of saffron to the consistence of honey, digesting the residue in alcohol, filtering the tincture, and evaporating it to dryness. It is a reddish-yellow mass, of an agreeable smell, slightly bitter, soluble in water and alcohol, and somewhat deliquescent. Nitric acid added to its solution renders it of a grass-green color, sulphuric acid changes it to blue and then violet, and on exposure to light, or to the action of chlorine, it becomes colorless. It contains about twenty per cent. of volatile oil, to which the medicine owes its activity, and which can be separated only by an alkali. When pure, polychroite is of a brilliant red, readily soluble in alcohol, and the fixed and volatile oils, and difficultly soluble in water, which it renders yellow. The volatile oil of saffron may be partially separated by distillation; it is yellow, of a hot, acrid, bitterish taste, and heavier than water, in which it is slightly soluble.

Saffron is very liable to be adulterated with water, oil, flowers of other plants, fibers of dried beef, etc. Hot water will detect the adulteration with flowers by their expansion, while in it; muscular fibers may be known by the odor of burning horn emitted on burning the suspected article. When rubbed between the finger and thumb without staining the skin yellow, the saffron has been exhausted by water or spirit. A

certain test of saffron is concentrated sulphuric acid, which changes the color of pure saffron to indigo blue.

Properties and Uses.—Emmenagogue and diaphoretic. Has been of benefit in amenorrhœa, dysmenorrhœa, chlorosis, hysteria, and in suppression of the lochial discharge. As a diaphoretic, used in febrile and exanthematous diseases, especially of children. Many consider this valuable agent as inert. Dose of the powder, from twelve to forty grains; of the tincture or syrup, from one to two fluidrachms; of the decoction, from one to three fluidounces.

Off. Prep.—Tinct. Aloes et Myrrhæ; Tinctura Serpentariæ Composita.

CROTON ELEUTERIA.

Cascarilla.

Nat. Ord.—Euphorbiacæ. *Sex. Syst.*—Monœcia Monadelphia.

THE BARK.

Description.—Croton Eleuteria is a small tree, said to rise to the height of twenty feet, and branching thickly at the top. The *branches* and *twigs* are angular, rather compressed, striated, downy, ferruginous. The *leaves* are petiolated, alternate, ovate, with a short but obtuse point, entire, faintly nerved, bright-green above, with a few scattered grayish dots, silvery, and very tomentose beneath; *petioles* short, scurfy. *Racemes* axillary and terminal, branched or compound; the branches short, divaricating, covered with numerous, closely-parted, subsessile, whitish, monœcious flowers. *Sterile flowers* above and smallest; *fertile ones* below, few, and on short stalks. *Stamens* ten to twelve. *Capsule* roundish, minutely warted, scurfy, not much larger than a pea, with three furrows, three cells, and six valves.

History.—The tree from which Cascarilla is obtained is a native of the West Indies, and is found abundantly in the small island of Eleutheria, from which it derives its name. It was, for a time, supposed to have been derived from the *Croton Cascarilla*, a small tree growing in the Bahamas, Hayti, Peru, and Paraguay, but this is now ascertained by botanists to have been an error. Cascarilla bark comes to this market from the West Indies, in bags or casks, and is had in two forms; in one, it is in rolled fragments of various sizes, having a dull-whitish or whitish-gray epidermis, which is frequently more or less removed, and beneath which it is of a dark-brown color, while its inner surface has a chocolate tint, and its fracture is reddish-brown. In the other variety, it is in very thin pieces, an inch or two in length, not covered by the white epidermis, curved more or less longitudinally, and often with laminae of wood adhering to their inner surface, as if the bark had been removed from the tree by means of a sharp instrument. The first variety is obtained

from the *Croton Eleuteria*; the source of the second is not so well ascertained, though supposed by some to be the *Croton Micans*.

The bark is dense, brittle, and easily pulverized, the powder being of a light-brown color, with a feeble aromatic odor, increased by friction and much more so by burning, and having a strong, aromatic, bitterish, acrid taste. On account of its delicate and agreeable odor, it is often added in small portions to tobacco, by smokers, to render the fumes more fragrant. Water or spirit readily extracts its active principles, but diluted alcohol is the proper menstruum. Analysis has detected in it, albumen, a peculiar kind of tannin, a bitter crystallizable principle called *Cascarillin*, a red coloring matter, fatty matter of a nauseous odor, wax, gum, resin, volatile oil, starch, pectic acid, chloride of potassium, a salt of lime, and lignin. The *Cascarillin* is white, crystallized, inodorous, of a bitter taste, sparingly soluble in water, but readily so in alcohol or ether, neutral, and without nitrogen. It may be obtained by treating the powdered bark with water, adding acetate of lead to the solution, separating the lead by sulphureted hydrogen, filtering, evaporating with the addition of animal charcoal, filtering again, and evaporating at a low temperature to the consistence of a syrup; this must be allowed to harden by cooling, and the matter thus obtained must be purified by twice successively treating it, first with a little cold alcohol to separate the coloring and fatty matters, and afterward with boiling alcohol and animal charcoal; allow this last alcoholic solution to evaporate spontaneously. It resembles salicin in many respects.

Properties and Uses.—Tonic, and stimulant. Used in dyspepsia, flatulency, chronic diarrhea, in debility attending chronic diseases, convalescence from acute diseases, and to arrest vomiting. When cinchona produces nausea, the addition of cascarilla will prevent it. Dose of the powder, from one to two scruples; of the tincture, from one to four fluidrachms; of the infusion, from one to four fluidounces. On account of its musky odor, it is a common ingredient of fumigating pastilles.

CUCUMIS COLOCYNTHIS.

Colocynth.

Nat. Ord.—Cucurbitaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE FRUIT DEPRIVED OF ITS RIND.

Description.—*Colocynth*, or *Bitter Cucumber*, is an annual plant, bearing some resemblance to that of the watermelon, with a whitish root, and herbaceous, trailing, angular, branched, rough and hispid stem. The leaves are alternately on long petioles, of a triangular form, deeply and obtusely sinuated, of a bright green on the upper surface, paler beneath with whitish hairs; tendrils short; the flowers are solitary, axillary, pedunculate, and of a yellow color. The calyx of the male flower is

bell-shaped; the *corolla* is monopetalous, campanulate, divided at the margin into five pointed segments. The *stamens* are three, short, distinct; two are bifid at the apex, or rather have two anthers. The female flower is like the male, but the filaments are destitute of anthers. The *ovary* is inferior, large, with a very short cylindrical style, furnished with three thick stigmas. The *fruit* is a round pepo, the size and color of an orange, and smooth on the outside when ripe; the *rind* is thin, hard, and coriaceous; internally it is trilocular, each cell containing numerous ovate-acute, compressed seeds, enveloped by a white spongy pulp.

History.—The Bitter Apple, or Cucumber is a native of Northern Africa, the Cape of Good Hope, Western Asia, etc., and is cultivated in Italy and Spain. The fruit is collected in autumn when it begins to turn yellow, and after having been peeled, is dried quickly either in a stove, or by the sun. The colocynth with which the United States is supplied, is chiefly derived from the ports of the Levant. That which is deprived of its rind, is very white, light, spongy, and without seeds, is considered the best article; that which contains the seeds is inferior; and the grayish or brownish pith of the larger fruits is of the poorest quality. The pulp only of the fruit is the officinal portion; the fruit, as usually met with in the shops, is about the size of a small orange. The pulp is tough, pulverized with difficulty, nearly inodorous, but intensely and disagreeably bitter. Water, ether, or alcohol acquires its active properties; water forms a mucilaginous solution, from which the extract of colocynth is obtained by evaporation; it is pale-brown, translucent, elastic, and intensely bitter. Analysis has detected in colocynth, a bitter principle called *Colocynthin*, extractive, fixed oil, resin insoluble in ether, gum, pectic acid, phosphates of lime and magnesia, lignin, and a little water. It is *incompatible* with the fixed alkalies, sulphate of iron, nitrate of silver, acetate of lead, and vegetable astringents, containing tannin or gallic acid.

Colocynthin may be obtained by exhausting the pulp previously freed from the seeds, with successive portions of cold distilled water, until it is deprived of its bitterness; then filtering the solution, heating it to boiling point, and adding, while hot, diacetate of lead, as long as any precipitation continues. When cold, filter the supernatant liquid, and gradually add to it diluted sulphuric acid, until it no longer throws down a precipitate; again boil to remove the free acetic acid, and filter to separate the sulphate of lead. By this means all the organic matter, except the colocynthin, is removed. Evaporate the filtered liquor cautiously and nearly to dryness, and dissolve the colocynthin out of the residuum by means of strong alcohol, which leaves the salts undissolved as sulphates. By evaporating the alcoholic solution the colocynthin is obtained pure. Colocynthin is an amorphous, yellowish-brown, somewhat translucent, brittle, and friable substance, fusible at a temperature

below 212° , inflammable, more soluble in alcohol than in water, but imparting to the latter an intense bitterness. It is neutral; with infusion of galls its aqueous solution gives a copious white precipitate.

Properties and Uses.—Colocynth is a powerful drastic, hydragogue cathartic, exciting inflammation of the mucous membrane of the intestines, causing severe griping, vomiting, and bloody discharges. In small doses it acts powerfully and harshly, and is, therefore, never used alone, but generally in combination with other cathartics, which tends to modify its irritating influence. The addition of extract of hyoscyamus will likewise deprive it of its harsh and griping effects. Its principal employment is in passive dropsy, in cerebral derangements, and in pills with other cathartics for the purpose of overcoming torpid conditions of the biliary and digestive systems. Its irritant effect upon the rectum may influence the uterus by sympathy of contiguity, and thus provoke menstruation, and on the same principle, dissolved in whisky, it has cured gonorrhea. It may be used in moderate doses, in all diseases where catharsis is indicated. The powder applied to an ulcer, or raw-surface, affects the lower bowels in the same manner as when taken internally. It is said that Hippocrates used the colocynth as a pessary for the purpose of exciting menstruation. The oil of colocynth has been recommended as an external remedy for neuralgia. Dose of colocynth, is from four to ten grains, either in powder, or aqueous extract; of the alcoholic extract, from one to four grains. When to be given alone, it should be triturated with some inert or insoluble powders, as gum or farinaceous matter, in order to diminish its severity of action.

Off. Prep.—Extractum Colocynthidis; Extractum Colocynthidis Compositum.

CUCURBITA CITRULLUS.

Watermelon.

CUCURBITA PEPO.

Pumpkin.

Nat. Ord.—Cucurbitaceæ. *Sex. Syst.*—Monœcia Monadelphica.

THE SEEDS.

Description.—The Cucurbita Citrullus of Linnæus, and Cucumis Citrullus of Seringe, is an annual plant with a prostrate, slender, hairy stem, with branching tendrils. The leaves are palmately five-lobed, very glaucous beneath, lobes mostly sinuate-pinnatifid, all the segments obtuse. The flowers are yellow, solitary, on hairy peduncles, and bracted at the base. Calyx tubular-campanulate, five-toothed; corolla deeply five-parted; filaments of the male flower, three; pistils of the female, three-cleft; style short; stigmas three, thick, two-lobed; pepo

or *fruit*, oval, or elliptical, smooth, discolored, indehiscent, subligneous, and light or dark-green externally, beneath which is a white, juicy substance, and in the center a red or yellow edible pulp, sweet, juicy or watery, and delicious; it is from three to five-celled, and contains many obovate, smooth, compressed seeds, thickened at the margin, and of a black or yellowish-white color.

Cucurbita Pepo is also an annual plant, hispid and scabrous, with a procumbent *stem* and branching *tendrils*. The *leaves* are large, cordate, palmately five-lobed, or angled, denticulate; the *flowers* are yellow, large, axillary, the males long-pedunculate. *Corolla* campanulate; *petals* united and coherent with the calyx. *Calyx* of male flowers, five-toothed; of females the same, and upper part deciduous after flowering; *stigmas* three, thick, two-lobed; *pepo* or *fruit* sub-ligneous, very large, roundish, or oblong, smooth, yellow when ripe, furrowed and torulose, containing yellowish seeds, somewhat resembling those of the water-melon in form.

History.—The Watermelon is a native of Africa and Southern Asia, and is cultivated in this country for its large and delicious fruit which is usually ripened in August, the flowers appearing in June and July. The pumpkin flowers in July, and matures its fruit in September and October; it is a native of the Levant, and is extensively cultivated as a kitchen vegetable, and for cattle. The seeds of these plants are used in medicine; their virtues reside in the external covering which contains a large proportion of mucilage, which is freely imparted to water; hence, in preparing an infusion the seeds should never be bruised. An oil may be obtained from the pumpkin seeds, and probably from those of the watermelon also, by expression.

Properties and Uses.—Mucilaginous and diuretic, and of service in strangury, and other urinary affections, also in gastritis, enteritis, and febrile diseases. The infusion may be drank freely. The red, fleshy, juicy pulp of the watermelon is diuretic, and forms a grateful article of diet for febrile patients, when not contra-indicated. The expressed oil of the pumpkin seeds, in doses of from six to twelve drops several times a day, is said to be a most certain and efficient diuretic, giving quick relief in scalding of urine, spasmodic affections of the urinary passages, and has cured gonorrhea. The seeds of the *Cucurbita Lagenaria*, or gourd, the *Cucumis Melo*, or muskmelon, and the *Cucumis Sativus*, or cucumber, possess similar properties, but in a milder degree.

Off. Prep.—Infusum Cucurbitæ.

CUMINUM CYMINUM.

Cumin Seed.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE FRUIT.

Description.—This is an annual, herbaceous plant, about six or eight inches high, having a round, slender, branching *stem*, and numerous multifid *leaves*, with long, filiform, deep-green segments. The *flowers* are small, white, or purple, overtopped by the bracts, which after flowering are reflexed, and are disposed in numerous terminal *umbels*, which have very few rays, partial and general involucre, consisting of two or three filiform, one-sided bracts. The *fruit* is about two lines long, much longer than the pedicels, nearly taper, but little contracted at the sides, fusiform, crowned by the short teeth of the calyx, densely covered with short rough hair upon the channels, less densely upon the ridges, which are paler, filiform, and a little raised; it consists of two oblong plano-convex half fruits, commonly called seeds, united by their flat sides.

History.—This plant is a native of Egypt, and is cultivated for its fruit in many parts of Europe. The seeds are elliptical, flat on one side, convex, furrowed, and rough on the other, about one-sixth of an inch in length, and of a light brown color. Each has seven longitudinal ridges. Two seeds are sometimes united together as upon the plant. Their odor is peculiar, strong and heavy; their taste warm, bitterish, aromatic, and disagreeable. They contain much essential oil, which is of a yellowish color, and has the sensible properties of the seeds.

Properties and Uses.—Highly stimulant, and carminative; possessing medical properties similar to the other aromatic fruits of umbelliferous plants, but more stimulating. They are seldom used in the United States. Dose is from fifteen to sixty grains.

CUNILA MARIANA.

Dittany.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE WHOLE HERB.

Description.—This plant, also called *Stonemint*, *Mountain dittany*, etc., is an indigenous, perennial plant, with a fibrous *root*, and smooth, slender, four-angled, mostly purplish, corymbosely branched *stems*, growing one or two feet high; the *branches* opposite, or nearly so. The *leaves* are opposite, small, smooth, ovate, subsessile, rounded or cordate at the base, punctate with resinous and pellucid dots, of a dry texture, pale-green above, glaucous beneath, and margin waved, with small, acute

serratures. The *flowers* are numerous, in terminal and sometimes axillary dichotomous corymbs, and of a bluish-purple, and sometimes white color. Each flower is pedunculate. The *calyx* is green, with ten longitudinal striæ, and five nearly equal teeth. The *corolla* is twice as long as the calyx, bilabiate, pubescent; lower lip largest, with three rounded lobes; upper lip, flat and emarginate. *Stamens* four; two of them long, slender, and exserted, bearing small, didymous *anthers*; the other two sterile and very short. The *stigma* is bifid, exserted. The *seeds* are four, small, obovate, at the base of the persistent calyx, the mouth of which is closed by rigid hairs.

History.—Found in most parts of the United States, in dry soils, shady and hilly woods, and flowering from June to the last of September. It has a warm, pungent taste, and a powerful aromatic smell, depending on the presence of a volatile oil.

Properties and Uses.—Stimulant, carminative, antispasmodic, and diaphoretic. Used freely in warm infusion to promote perspiration, to relieve flatulency, and as an emmenagogue. Said to be useful for cold, headaches, and fevers, also to relieve nervous headache, and hysterical disorders, colic, indigestion, and all nervous affections. The volatile oil possesses all the medicinal properties of the herb, and may be given in doses of from five to ten drops.

CUPRI SUBACETAS.

Subacetate of Copper.

Preparation.—Subacetate of Copper, or *Verdigris* is prepared in the South of France, and is imported into this country from Bordeaux and Marseilles principally. It is formed by exposing sheet-copper to the action of the acetous fumes, which are evolved in the process of wine-making. The refuse of the grapes placed in heaps runs into the acetous fermentation, whereby the copper sheets are oxidized, and the oxide so formed unites with the acid. This is scraped off, usually about the end of four or six weeks, and the plates are again stratified with the grape refuse, to be further acted on. The scrapings which are in the form of a paste, are well beaten with wooden mallets, and packed in leathern sacks, each weighing from twenty-five to thirty pounds. Verdigris may also be formed by sprinkling vinegar over the copper; and in England it is prepared by alternating copper plates with woolen cloths steeped in pyroligneous acid.

History.—Verdigris is obtained in loosely aggregated lumps, or in powder; it has a pale-green, or blue color, according to the process employed in obtaining it, a disagreeable, acetous odor when the powder is conveyed to the nostrils, and a nauseous, styptic, coppery taste. It is insoluble in alcohol, and is partially soluble in water, undergoing a

decomposition, by which an insoluble tris-acetate of copper is precipitated, of a dark-green color, gradually changing to black; and a soluble neutral acetate is dissolved. This neutral acetate may be obtained by evaporation in fine rhomboidal or rhombic-octahedral crystals of a beautiful bluish-green color. They are efflorescent, soluble in five parts of boiling water, partially soluble in alcohol, inflammable, burning in the open air with a beautiful green flame, and are known as *Crystals of Venus*, *Crystallized Acetate of Copper*, etc. Verdigris is speedily blackened by sulphureted hydrogen; diluted sulphuric acid dissolves all except its impurities, forming a blue solution, from which sulphate of copper may be crystallized; concentrated sulphuric acid decomposes it, evolving acetous fumes. Ammonia dissolves all but its impurities forming a solution of an intense violet-blue; so likewise does diluted muriatic acid, forming a fine green solution. Good verdigris has a lively green color, is free from white or black spots, is dry, and difficult to break; it is composed of two equivalents of peroxide of copper, one equivalent of acetic acid, and six equivalents of water. It is a variable mixture of the subacetates of copper, and is sometimes called the *Diacetate* of copper. The green rust on copper culinary vessels, popularly termed Verdigris, is a carbonate of copper. Verdigris, when swallowed, is decomposed by zinc and copper filings, in the dose of from half a drachm to two drachms, followed by the free use of warm water.

Properties and Uses.—Detergent and escharotic. Never used internally, but occasionally employed externally by some practitioners to remove warts and fungous growths, and as an application to foul ulcers, ringworm, ringworm of the scalp, ophthalmia tarsi, etc. The powder may be sprinkled on the surface, or it may be used in the form of ointment. When taken internally its poisonous influences can be best overcome by the free use of sugared water, and white of eggs; they are the best antidotes. It is best employed as an escharotic when deprived of its water of crystallization by heat, which leaves an efflorescent mass.

CUPRI SULPHAS.

Sulphate of Copper.

Preparation.—Sulphate of Copper, or *Blue Vitriol*, is made in various ways: by dissolving copper in dilute sulphuric acid, evaporating and crystallizing; or by roasting the native sulphuret in a reverberatory furnace, whereby it is made to pass into the state of sulphate, by absorbing oxygen. The roasted mass is lixiviated, and the solution obtained is evaporated that crystals may form. The salt procured by either of these methods, contains a little sulphate of the sesquioxide of iron, from which it may be freed by adding an excess of protoxide of copper, which has the effect of precipitating the sesquioxide of iron. The third method

alluded to is pursued in France. It consists in wetting, and then sprinkling with sulphur, sheets of copper, which are next heated to redness for some time, and afterward plunged into water while yet hot. The same operation is repeated until the sheets are entirely corroded. At first a sulphuret is formed, which by the action of heat and air gradually passes into the state of sulphate. This is dissolved in the water, and is obtained in crystals by evaporation.

On account of the duty upon sulphate of copper, none of it is at present imported into the United States, the whole demand being supplied from our own laboratories. The process for making it, generally pursued in this country, is by direct combination between old scrap copper and sulphuric acid.

History.—Sulphate of copper crystallizes in large, translucent, oblique rhombic prisms, of a beautiful azure-blue color, which slightly effloresce in the air, and are soluble in two parts of boiling and four of cold water, and insoluble in alcohol. The salt is inodorous, but has an intense styptic metallic disagreeable taste. When heated it first fuses in its water of crystallization, and then gradually becomes a white anhydrous powder; if the heat be increased, it undergoes the igneous fusion: and at an elevated temperature it slowly parts with its acid, leaving the brown protoxide of copper. The solution of sulphate of copper is of a fine blue color; sulphureted hydrogen causes a brownish-black precipitate, when added to it; caustic potassa, a bluish-green precipitate, but if added in slight excess, azure-blue; ammonia, an azure-blue, which is redissolved if an excess of the alkali be added; solution of arsenious acid with the addition of an alkali, a grass-green or apple-green. *Aqua sapphirina* is the deep-blue solution made by ammonia redissolving the bluish-white precipitate of hydrated oxide of copper, produced by potassa, soda, or ammonia, added to the solution of blue vitriol. Sulphate of copper is likewise *incompatible* with alkaline carbonates, borax, acetate of lead, acetate of iron, nitrate of silver, corrosive sublimate, tartrate of potassa, chloride of calcium, and all astringent vegetable infusions. If sesquioxide of iron be present it will become very green on the surface when exposed to the air; which may also be known by not being re-dissolved with the precipitate caused by ammonia, on adding an excess of the alkali. It is composed of one equivalent of sulphuric acid, one of protoxide of copper, and five of water.

Properties and Uses.—Internally, we never use it. Externally, it is occasionally employed as an escharotic or stimulant; and is applied by some practitioners to ill-conditioned ulcers, warts, fungous granulations, chancres, callous edges, as a styptic to capillary hemorrhage, and as a collyrium in some cases of chronic ophthalmia; a stimulant wash may be made by adding from two to eight grains of the salt to the fluidounce of water. In cases of poisoning by sulphate of copper, empty the

stomach, and give white of eggs freely in sugared water. Treat inflammatory symptoms upon general principles.

CURCUMA LONGA.

Turmeric.

Nat. Ord.—Zingiberaceæ. *Sex. Syst.*—Monandria Monogynia.

THE RHIZOMA.

Description.—This plant has a perennial, tuberous, oblong, palmate root, of a deep-orange color internally. The leaves are radical, large, lanceolate, obliquely nerved, sheathing at their base, tapering at each end, smooth, of a uniform green color, and closely embracing each other. The scape rises from the center of the leaves, is short, thick, smooth, green, and constitutes a spike of numerous imbricated bracteal scales, between which the flowers successively make their appearance.

History.—Turmeric is a native of the East Indies and Cochin-China. The best is said to come from China. The dried root is in cylindrical or oblong pieces, about as thick as the finger, but not so long, tuberculated, somewhat contorted, externally yellowish-brown, internally deep orange-yellow, hard, compact, and having a waxy fracture. It has a peculiar odor and a warm, bitterish, and feebly aromatic taste; and yields its properties to water or alcohol. The saliva is tinged yellow by it, when the root is chewed. It contains lignin, a fourth of its weight of yellowish starch, a small quantity of acrid, volatile oil, gum, a brown coloring matter, chloride of calcium, and an uncrystallizable yellow coloring matter named *Curcumin*. This may be obtained by digesting the alcoholic extract of turmeric in ether, and evaporating the ethereal tincture. In this state it is mixed with a little volatile oil, from which it may be separated and obtained pure, by oxide of lead. It is brown in mass, yellow in powder, inodorous, tasteless, scarcely soluble in water, freely soluble in alcohol, ether, and the oils, fusible at 104°, and turned to a reddish-brown by the action of alkalies.

Properties and Uses.—Stimulant aromatic. Seldom used, except to color ointments and other pharmaceutic preparations. *Turmeric Paper* is used as a test of acids and alkalies, and is prepared by tinging white unsized paper with a tincture or decoction of Turmeric. The tincture may be made with one part of turmeric to six of proof spirit; the decoction, with one part of the root to ten or twelve parts of water. Alkalies change turmeric to a reddish-brown. The concentrated mineral acids, boracic acid, and numerous salts, are said also to turn turmeric paper red, or reddish-brown—if this be so, its indications cannot be relied on with certainty.

CYDONIA VULGARIS.

Quince.

Nat. Ord.—Pomaceæ. *Sex. Syst.*—Icosandria Pentagynia.

THE SEEDS.

Description.—This is a well-known shrub or tree from eight to twenty feet high, the *leaves* being oblong-ovate, obtuse at base, acute at apex, entire, smooth above, tomentose beneath. The *flowers* are solitary, white with a purple tinge, large, terminal. The *pome* or *fruit* tomentose, obovoid, yellow when ripe, of an agreeable odor, and a rough, astringent, acidulous taste, and in each of its five cells contains from eight to fourteen seeds.

History.—The Quince Tree is a native of Candia, but is cultivated extensively in this country and Europe, and its fruit is much employed in making jellies, preserves, etc. The seeds are the officinal portion; they are ovate, angled, reddish-brown externally, white within, inodorous, nearly tasteless, being slightly bitter when long chewed. The external covering of the seeds contains an abundance of mucilage, which may be extracted by boiling water; two drachms of the seeds will render a pint of water thick and ropy. The decoction, evaporated to dryness and powdered, will form a proper mucilage with water in the proportions of three grains to the fluidounce. One part of it gives a semi-syrupy consistence to a thousand parts of water. Pereira proposes to call this mucilage *Cydonin*; he considers it a peculiar variety of gum, which, like Arabin, is soluble in cold or boiling water, and gelatinizes with sesquichloride of iron; but, unlike that principle, it is not affected by silicate of potassa.

Properties and Uses.—Decoction of Quince Seeds forms a demulcent mucilage, very useful in gonorrhea, dysentery, aphthous affections, and excoriations of the mouth and fauces, also as a collyrium in conjunctival ophthalmia. A syrup prepared from the fruit, or the jelly, forms an agreeable article, either alone or added to drinks, for patients laboring under febrile diseases, diarrhea, dysentery, and nausea.

Off. Prep.—Decoctum Cydonii.

CYNARA SCOLYMUS.

Garden Artichoke.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE LEAVES.

Description.—This is a perennial plant, with subspinose, pinnate and undivided leaves; heads discoid, homogamous; involucre dilated, imbric-

cate ; *scales* ovate, with fleshy bases, emarginate, pointed ; *receptacle* setaceous ; *pappus* plumose, sessile ; *achenia* not beaked.

History.—This well-known plant is indigenous in the south of Europe, and is cultivated in this country from suckers, as a culinary vegetable, they being placed in rows about three feet apart. The flowers or *heads* as they are commonly called, appear in August and September, and are the parts used ; the receptacle and the lower portion of the fleshy leaflets of the calyx are eaten, and the other parts rejected. When young, the heads are cut up raw and eaten as salad ; when older, they are boiled, and dressed variously. The flowers are said to curdle milk, and the plant to afford a good yellow dye. The leaves and their expressed juice are very bitter.

Properties and Uses.—Diuretic and alterative. Reputed very beneficial in dropsies, and recommended, in the form of tincture or extract, in rheumatic, gouty and neuralgic affections. The leaves should be fresh, and the preparations made from them quickly used. Dose, of the tincture a fluidrachm, or five grains of the extract, three times a day.

This plant must not be confounded with the *Helianthus Tuberosus*, or Jerusalem Artichoke, a species of sunflower, and the tuberous roots of which are sometimes used as a substitute for potatoes.

CYNOGLOSSUM OFFICINALE.

Hound's Tongue.

Nat. Ord.—Boraginaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES AND ROOT.

Description.—This is a biennial plant, with an erect, silky-pubescent stem, growing from one to two feet in height. The leaves are hoary, with soft down on both sides, lanceolate, acute, entire,—radical ones alternate at the base, petiolate,—cauline ones sessile, clasping, with rounded or slightly heart-shaped bases. The flowers are in terminal, paniced clusters, recurved at the end ; *calyx* downy, five-parted ; *corolla* reddish-purple, short, funnel-form, vaulted ; throat or orifice closed by five converging, convex scales. *Stamens* shorter than the corolla. *Achenia* depressed, fixed laterally to the style ; *seeds* rough, with hooked prickles.

History.—This plant is common both in Europe and this country, growing in waste grounds and road-sides, and is named from the shape of its leaves ; it bears purple flowers in June and July. The leaves and root have been employed, but the latter are preferred. It has a disagreeable narcotic odor, resembling that of mice, which is dissipated by drying ; and a nauseous, bitterish, and mucilaginous taste. The fresh plant is much more active than the dried.

Properties and Uses.—Anodyne, demulcent and astringent, and has been used in coughs, catarrh, hemoptysis, diarrhea and dysentery. Externally, in the form of a poultice, it has been found highly beneficial in scrofulous tumors, burns, goitre, and may be applied to recent contusions or inflammations, with much advantage, also to remove the pain and soreness attending irritated, bruised, or chafed parts, giving complete and immediate relief, especially in excoriation of the feet from much traveling. The tincture or the application of the fresh leaves, bruised, will remove the swelling and ecchymosis consequent upon severe blows or bruises. The *C. Amplexicaule*, or Wild Comfrey, affords a root which may be substituted for the officinal Comfrey.

CYNOGLOSSUM MORRISONI, variously called *Virginian Mouse-ear*, *Beggar's-lice*, and *Dysentery Weed*, has been variously classified by Botanists, as *Rochelia Virginiana*, *Myosotis Virginica*, and *Echinosperrum Virginicum*. It is an annual plant, with an erect, hairy, furrowed, very broadly branched and leafy stem, from two to four feet in height. The leaves are from three to four inches long, oblong-lanceolate, acuminate, entire, remote, tapering at the base, thin, minutely downy underneath, and scabrous above; the lower ones petioled. The branches are slender and remote, each terminating in a centrifugal, divaricate, dichotomous, hairy, paniculate raceme, leafy-bracted at the base. The flowers are very small, white or pale-blue, the pedicels nodding in fruit. Fruit convex, densely covered with prickles having barbed points. This plant is common throughout the United States, growing in rocky grounds and among rubbish, and flowering in July. The whole plant has an unpleasant odor. The root is the part used, and imparts its virtues to water. It is mucilaginous, tonic, and astringent, and has been found very efficacious in diarrhea and dysentery. From its excellent effects in these diseases, it has acquired the popular name of *Dysentery Root*. The root may be chewed, or given in powder or infusion, *ad libitum*. It will, probably, be found useful in other diseases, where such a combination of properties is indicated.

CYPRIPEDIUM PUBESCENS.

Yellow Ladies' Slipper.

Nat. Ord.—Orchidaceæ. *Sex. Syst.*—Gynandria Diandria.

THE ROOT.

Description.—Cypripedium Pubescens is an indigenous plant, known by various names, as *American Valerian*, *Umbel*, *Nerve-Root*, *Yellow-Moccasin Flower*, *Noah's Ark*, etc.; its roots are perennial, fibrous, fleshy, undulated or crooked, long, about a line in diameter, and from which arise one or several round, leafy stems, growing from twelve to

eighteen inches high. The *leaves* are from three to six inches long by two or three broad, sheathing, oblong-lanceolate, entire, veined, cauline, acuminate, pubescent, alternate, generally the same number on each side. *Flowers* large, very showy, terminal, solitary. *Segments* four. *Lobe of the style* triangular-oblong, obtuse; *sepals* ovate, oblong, acuminate; *petals* long, linear, contorted; *lip* shorter than the other petals, compressed laterally, very convex and gibbous above, pale-yellow, from one and a half to two inches long.

Cypripedium Parviflorum, has been considered a distinct species by some Botanists, and as a mere variety by others. It differs from the above, in having the *lobe of the style* acute, the *leaves* are broader, the *flowers* somewhat larger, and the *perianth* more brownish-purple in color.

History.—This plant is found in most parts of the United States, in rich woods and meadows, flowering in May and June; its flowers are scentless. There are several varieties of it, all of which possess similar virtues, and the roots of which are undoubtedly collected, sold, and used, with the officinal article indiscriminately. They are as follows:

1. *C. Spectabile*, or Showy Ladies-slipper, having crowded, ovate-lanceolate *leaves*, embracing each other; *lobe of the style* elliptic-cordate, obtuse; *sepals* broad-ovate, obtuse; *lip* longer than the petals, not cleft before, white, striped with purple, two inches long, one and a half broad; *flowers* very large, two or three on each plant, appearing in June and July. The whole plant pubescent.

2. *C. Acaule*, Low or Stemless Ladies-slipper, having a bulbous root with numerous fleshy fibers; *scape* leafless, one-flowered; *leaves* radical, in pairs, oblong, obtuse; *lobe of the style* round-rhomboid, acuminate, deflexed; *lip* longer than the lanceolate-petals, cleft before, purple or white, nearly two inches long, veiny; *flowers* solitary, terminal, with a single, lanceolate bract at the base, and appearing in May and June.

3. *C. Candidum*, Small white, or White-flowered Ladies-slipper, having a leafy *stem*, oblong-lanceolate *leaves*; *lobe of the style* lanceolate, somewhat obtuse; *lip* rather shorter than the lance-linear petals, white, about three-quarters of an inch long; *flowers* terminal, solitary. The plant is slightly pubescent, seldom growing above a foot in height; the flowers appear in May and June.

4. *C. Arietinum*, or Ram's Head, having a leafy *stem*; elliptical, striate-veined, sessile, amplexicaul *leaves*; *lobe of the style* orbicular, somewhat obtuse; *lip* as long as the petals, saccate, obconic before, red, and white veined, hairy at the orifice, about half an inch long; *perianth* greenish-brown. The flowers are mostly solitary with a leafy bract at base, and appear in May and June.

The *C. Spectabile* and *C. Acaule*, are said to possess more narcotic properties than the others, especially when inhabiting dark swamps.

The fibrous roots of these plants are the parts used in medicine; they should be gathered in autumn, cleansed from dirt, and carefully dried in the shade. They have a peculiar, slightly bitter, and rather nauseous taste, and a somewhat unpleasant odor. As met with in the shops, they are composed of many long, fleshy, cylindrical fibers, of a pale-yellow color, matted together. Alcohol, or boiling water takes up their virtues, which, however, are impaired by boiling. No analysis has been made of them.

Properties and Uses.—Tonic, stimulant, diaphoretic, and antispasmodic. Useful in hysteria, chorea, nervous headache, and all cases of nervous irritability; and combined with *Eupatorium Aromaticum* and *Scutellaria Lateriflora*, it has proved beneficial in neuralgia, delirium, and hypochondria. The alcoholic extract is the best form of administration. Dose, from ten to twenty grains; tincture, from one to three fluid-drachms; infusion, from one to four fluidounces; of the powder, one drachm in warm water, repeated as often as required. The following preparation has been used in sick or nervous headache, not dependent on acid stomach, in several hundred cases, by various practitioners: Take of nepeta cataria, scutellaria lateriflora, and cypripedium pubescens in powder, of each, half an ounce—pour on a pint of boiling water, and infuse for fifteen or twenty minutes; dose, one fluidounce of the warm infusion; after which, half a fluidounce, every half hour, for three or four hours, or until the headache ceases. Used thus, during three or four attacks of headache, it has, as far as I am informed, invariably effected permanent cures of this distressing complaint. An infusion is said to be beneficial in the pains of the joints following scarlet fever. Although considered by many practitioners superior to the foreign valerian, yet it will be found inefficient in many instances where the European article will prove beneficial.

Off. Prep. — Extractum Cypripedii Hydro-alcoholicum; Extractum Cypripedii Fluidum; Infusum Cypripedii; Tinctura Serpentariæ Composita.

CYTISUS SCOPARIUS.

Common Broom.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Diadelphia Decandria.

THE FRESH TOPS AND SEEDS.

Description.—This is a large bushy shrub, growing from three to eight feet high, with numerous, long, strait, pentangular, bright-green, smooth, tough, very flexible branches. The leaves are deciduous, scattered, stalked, ternate; the upper ones generally simple; the leaflets

are uniform, obovate, obtuse, entire, silky when young. The *flowers* are numerous, papilionaceous, large, showy, of a golden-yellow color, and are supported solitarily upon short, axillary peduncles. *Legume* brown, flat, above an inch long, nearly smooth at the sides, but fringed with hairs at each margin, and containing about fifteen or sixteen seeds. The swelling ovary soon splits the tube of the filaments.

History.—This is a common European shrub, cultivated in our gardens ; it grows on dry and sandy soils, and flowers in May and June. The tops of the branches and the seeds are the officinal parts ; the latter may be preserved for a longer time than the former ; all parts of the plant have a peculiar, bitter, nauseous taste, and when bruised, emit a strong, peculiar odor. They contain oils, mucilage, albumen, etc., and yield their virtues to water or alcohol. The flower-buds are sometimes pickled as a substitute for capers.

Properties and Uses.—In large doses, emetic and cathartic ; in small ones, diuretic. Used in dropsy ; said never to fail in increasing the flow of the urine ; especially beneficial in dropsy of the thorax combined with disease of the lungs. Dose, of a strong decoction, four fluidounces every hour until it produces some effect ; of the pulverized seed, from ten to fifteen grains, aided by the free use of diluents. Seldom used in this country.

Off. Prep.—Decoetum Scoparii.

DAPHNE MEZEREUM.

Mezereon.

Nat. Ord.—Thymelacæ. *Sex. Syst.*—Octandria Monogynia.

THE BARK.

Description.—Mezereon, or *Spurge Olive*, is a very hardy shrub, with a large root, and bushy stem four or five feet high, with upright, alternate, smooth, tough, and pliant branches, leafy when young, and a smooth dark-gray bark, which is easily separable from the wood. The leaves spring from the end of the branches, they are deciduous, scattered, sessile, obovate-lanceolate, entire, smooth, of a pale-green color, somewhat glaucous beneath, and about two inches long ; they appear after the flowers, and accompanied with the flower-buds of the next season. The flowers are in clusters, each consisting of two or three flowers, forming a kind of spike at the upper part of the stem and branches, sessile on the naked branches, with several brown, smooth, ovate bracts underneath ; they are of a pale-rose color, very fragrant, and consist of a hypocrateriform calyx, crimson all over, and the tube externally hairy. Segments of the calyx four, deep, ovate, spreading. Stamens eight, alternately longer, inserted into the tube, and having roundish, oblong

anthers. Ovary ovate, superior, bearing a short style with a flattish, entire stigma. The fruit is a pulpy, scarlet, oval, shining berry, containing a single seed.

Daphne Gnidium is a small bush, with the leaves linear-lanceolate, clustered, acuminate, cuspidate, quite smooth. The flowers are numerous, small, white, downy, fragrant, and in terminal paniced racemes. The fruit is globular, dry, at first green, but ultimately black.

Daphne Laureola or Spurge-laurel is a smooth plant, with a stem two or three feet high, and round, pale, brown, upright, tough and pliant branches, crowned with tufts of evergreen leaves, elegantly drooping in all directions, and about two or three inches long, lanceolate, glabrous, acute, entire, subsessile. Flowers deep-green, with orange anthers, four of which are just visible in the throat of the calyx, five together in each axillary raceme. An oval, concave bract accompanies each short partial stalk, at the base. Berry oval, black.

History.—All the species of *Daphne* possess active properties, but the bark met with in commerce is usually obtained from the three above described, that from the latter being less active than the others. The *D. Mezereum* is a native of the northern parts of Europe, where it is cultivated both as a medicine and an ornament; it flowers very early in the spring, often before the snow has disappeared. The *D. Gnidium* is found in the south of France on hills and barren plains, and its bark is employed there indiscriminately with that of the other species.

The bark of the root is the officinal part, but much that is obtained in the shops is derived from the stem. The *D. Mezereum* is the most active plant of the genus; its bark is generally collected in the spring. It is met with in flat or quilled pieces, from two to four feet long, and an inch or less in breadth, always folded in bundles, or in the shape of balls. Externally, it is covered with a grayish, or reddish-brown wrinkled epidermis, very thin, and easily removed from the bark, and beneath which is a soft, greenish tissue. The inner bark is tough, pliable, fibrous, striated, of a yellowish-white color internally, and an olive or brownish hue externally. Its smell when fresh is faint and disagreeable, but on drying it becomes inodorous; its taste is at first sweetish, soon followed by intense and durable hot acidity. It yields its virtues to water by decoction, likewise to alcohol; and it unites with oils or fats, forming an excellent ointment. It contains an acrid resin, a yellow coloring matter, a reddish-brown extractive matter, an uncrystallizable and fermentable sugar, a gummy matter containing azote, ligneous fiber, malic acid, several malates, and a peculiar principle named *Daphnin*.

Daphnin may be obtained by treating the alcoholic extract of the bark with water, decanting the solution, precipitating with subacetate of lead, filtering, decomposing the excess of the subacetate by sulphu-

reted hydrogen, — again filtering, evaporating to dryness, submitting the residue to the action of anhydrous alcohol, and evaporating the alcoholic solution to the point of crystallization. It is in colorless, transparent, brilliant, prismatic crystals, slightly soluble in cold water, very soluble in boiling water, ether, and alcohol, inodorous, and of a bitter, somewhat austere taste. It is not, however, the principle upon which the virtues of the bark chiefly depend; this is supposed to be a volatile oil, which slowly passes to the state of an acrid resin. It may be obtained by boiling mezereon in alcohol, allowing the liquor to cool in order that it may deposit some wax which it has taken up, then distilling off the alcohol, and treating the residue with water, which leaves the resin; it is dark-green, hard, brittle, and of an exceedingly acrid and persistent taste. When boiled with water some of the acrid principle of mezereon bark passes off, which is not the case when boiled with alcohol.

Properties and Uses.—In large doses, mezereon is an irritant poison, causing redness and vesication of the skin when left in contact with it, and causing, when swallowed, dryness and burning of the throat, vomiting, hypercatharsis, and frequently renal irritation. The berries have proved fatal to children who have eaten them; yet in some countries they are used as a purgative, in doses of eight to twelve. In small doses it acts as a stimulant, alterative, diuretic, diaphoretic in warm decoction, and cathartic. It acts favorably in syphilis, mercurio-syphilis, scrofula, chronic rheumatism, and some forms of obstinate disease of the skin. Dose of the decoction, from one to three fluidounces; of the powder ten grains.

Externally, it is seldom used by Eclectics; sometimes employed by other practitioners to produce rubefaction and vesication, and in the form of ointment as an application to blistered surfaces, indolent ulcers, and issues, in order to keep up a discharge. When vesication is desired, the bark is moistened with vinegar, after having been cut in the requisite form and size, and applied to the skin; it is renewed twice a day, until a blister is formed. It is slow in its operation, frequently requiring forty-eight hours to vesicate.

Off. Prep.—Decoctum Sarsaparillæ Compositum; Unguentum Mezerei.

DATURA STRAMONIUM.

Stramonium.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES AND SEEDS.

Description.—This plant, also known by the names of *Thorn Apple*, *Jamestown weed*, *Stinkweed*, *Apple-peru*, etc., is a bushy, smooth, fetid,

annual plant, two or three feet in height, and in rich soil even more ; the *root* is large, whitish, and furnished with numerous fibers. The *stem* is erect, round, smooth, somewhat shining, simple below, dichotomous above, with numerous spreading branches, of a yellowish-green color, cylindrical, often hollow. The *leaves* stand on short, round petioles in the forks of the stem, alternate, five or six inches long, ovate-triangular, or oval-oblong, irregularly sinuated, with large acute teeth and round sinuses, end acute, unequal at the base, decurrent, of a dark-green color on the upper surface, and paler beneath. The *flowers* are large, erect or nodding, axillary, solitary, on short peduncles, white. *Calyx* monosepalous, tubular, pentangular, five-toothed, deciduous, but leaving a persistent rim at the base which becomes reflexed. *Corolla* funnel-shaped, with a long tube, monopetalous ; its limb subangular, waved and folded, and terminating in five acuminate teeth. *Stamens* five ; *filaments* adhering to the tube, and supporting oblong, erect anthers. *Ovary* free, but coherent at base with the persistent rim of the calyx, oval, hairy ; *style* filiform, as long as the stamina, and bearing an obtuse, bi-lamellar stigma. *Fruit*, a large fleshy, roundish-ovate, four-valved, four-celled capsule, thickly covered on the outside with sharp spines or thorns, opening inside at the top, with numerous, reniform, black seeds filling the cells, and attached to a longitudinal receptacle occupying the center of each cell.

Datura Tatula, or Purple Stramonium, differs from the above, in having a dark-reddish stem, minutely dotted with green, and flowers of a purplish color, with deep purple stripes on the inside.

History.—Stramonium is a well-known, poisonous weed, growing in all parts of the United States, along road-sides, waste grounds, etc., and flowering from July to September. Its native country is unknown. It is found growing in Asia, Europe, Canada, Mexico, and Peru. The whole plant has an unpleasant, fetid, narcotic odor, which diminishes upon drying. Almost every part of the plant is possessed of medicinal properties, but the officinal parts are the leaves and seeds. The *leaves* should be gathered when the flowers are full blown, and carefully dried in the shade. They have a rank odor when fresh, especially if bruised, which is lost on drying, and a mawkish, bitter, nauseous taste. They impart their properties to water, alcohol, and the fixed oils. Water distilled from them slightly possesses their odor, but does not contain their active properties. They consist of gum, extractive, green starch, albumen, resin, saline matters, lignin, and water. The *seeds* are small, kidney-shaped, flat, of a dark-brown, almost black color when ripe, pale grayish-brown when unripe, inodorous, similar in taste with the leaves, with some acrimony. When bruised they emit the peculiar heavy odor of the herb. They should be gathered when ripe. They contain a glutinous matter, gum, albumen, a butyraceous substance, green wax, resin insoluble in ether, fixed oil, bassorin, sugar, gummy extractive,

orange-colored extractive, various saline and earthy substances, and a peculiar alkaline principle called *Daturia*. Water, spirit, and fixed oils take up their active properties.

Daturia may be obtained by evaporating the alcoholic tincture of the seeds with a very gentle heat, decolorizing by repeated additions of lime and sulphuric acid alternately, with filtration after each addition, and then still further concentrating by evaporation; an excess of powdered carbonate of soda is now to be added to decompose the product, and the precipitate which follows is to be separated, as speedily as possible, from the alkaline liquor by expressing, exhausting the residue with absolute alcohol, and treating the alkaline or mother waters, with sulphuric ether. The alcoholic and ethereal liquors are now to be united, and treated with lime, filtered, and then decolorized with animal charcoal. Distil off the etherized alcohol, add a little water, and evaporate by a very gentle heat. If the *daturia* now deposited should still be colored, it must be combined anew with an acid, and the whole process repeated from the addition of carbonate of soda onward, in order to obtain it quite pure. It crystallizes in colorless, inodorous, shining needles, at first bitterish when applied to the tongue, but ultimately conveying a flavor similar to that of tobacco. It dissolves in 280 parts of cold, and 72 of boiling water, is very soluble in alcohol, and less so in ether. It forms salts with acids. It is obtained from the seeds in very small proportions, yielding under the most favorable circumstances only one-fiftieth of one per cent. It is fusible, volatile, and very poisonous. Dr. Von Planta considers *daturia* identical with *atropia*, the formula of each being $C_{38}H_{23}NO_6$. By the destructive distillation of stramonium, Morries obtained a highly poisonous empyreumatized oil.

Properties and Uses.—In large doses, a powerfully narcotic poison, producing dryness of the throat, excessive thirst, nausea, vomiting, a sense of strangulation, faintness, anxiety, cardialgia, blindness, dilatation of the pupils, vertigo, delirium either of a furious or whimsical character, tremors of the limbs, palsy, stupor, convulsions, and often death. In less quantity it generally causes more or less cerebral disturbance for several hours, as vertigo, headache, dimness or perversion of vision, confusion of thought, and a species of intoxication or slight delirium. In medicinal doses, it acts as an anodyne-antispasmodic, without causing constipation, and will prove serviceable in cases where opium cannot be given. It has proved serviceable in mania, epilepsy, gastritis, and enteritis, and may likewise be used to allay rheumatic, syphilitic, and neuralgic pains. In combination with quinia, it forms an invaluable preparation which has been found exceedingly beneficial in intermittent fever, all periodic pains, headache, dysmenorrhea, delirium tremens, etc. The leaves, dried and smoked, are said to be useful in spasmodic asthma, but we do not recommend them, having more efficient means to cure

this disease. It is said that the seeds exert an influence, to prevent abortion, superior to anything else ; seven seeds to be given at first, after which one every hour, as may be required.

In plethoric habits, and in patients with determination to the head, stramonium must be administered with caution, keeping the excretory organs, as the skin, kidneys, and bowels in an active condition during its employment. Externally, a poultice of the fresh leaves, bruised, or the dried leaves in hot water, will be found an excellent application over the bowels in severe forms of gastritis, enteritis, peritonitis, etc. I have in many instances applied them to the perineum, in cases of retention of urine from enlarged prostate, where it was impossible to introduce a catheter, and after having allowed them to remain for about half an hour, have been enabled to pass the catheter with ease and facility, and thus afford relief to the patient. I have met with similar good results in urethral stricture. It will also be found beneficial as a local medication to all species of painful ulcers, acute ophthalmia, swelled breasts, inflammatory rheumatism, and hemorrhoidal tumors. An ointment of it is very valuable in many of the above diseases. In cases where the leaves cannot be obtained, a plaster of the alcoholic extract or inspissated juice, may be applied over the affected parts ; or the extract may be rendered thin by heating it in diluted alcohol, and then formed into a poultice with meal, or moistened bread, and applied. In the absence of belladonna, the extract of stramonium may be mixed with lard, and rubbed over the eyelid, or a solution of it dropped into the eye, in order to produce dilatation of the pupil, previous to the operation for cataract ; it is equally efficacious with this agent. Dose of the powdered leaves or seeds, from one to five grains ; of the extract, which is the best form of administration, from one-eighth of a grain to two grains ; of the tincture, for which the seeds bruised, are preferable, from five to thirty drops.

Daturia is seldom employed in medicine ; it is a very energetic poison, one-eighth of a grain having killed a sparrow in three hours, and nearly proved fatal to a cat when applied to the eye. Very minute quantities applied to the eye, occasion protracted and excessive dilatation of the pupil. In cases of poisoning by stramonium, the best mode of obtaining relief, is to evacuate the stomach by emetics or the stomach-pump, after which vinegar and water may be used, with mucilaginous drinks at a later period, and strong coffee, tea, and other stimulating drinks, if there is much prostration. Magneto-electricity may also be useful.

Off. Prep.—Cataplasma Stramonii ; Extractum Stramonii Alcoholicum ; Tinctura Stramonii ; Tinctura Viburnii Composita ; Unguentum Stramonii ; Unguentum Stramonii Compositum.

DAUCUS CAROTA.

Wild Carrot.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT AND SEEDS.

Description.—Wild Carrot has a biennial, slender, yellowish, spindle-shaped, aromatic and sweetish *root*, and an annual, round, furrowed, leafy, hispid *stem*, two or three feet high, which divides into long, erect, flower-bearing *branches*. The *leaves* are alternate, on broad, concave, ribbed petioles, and pale-green; the lower are large and tripinnate; the upper, smaller and less compound; in both, the *leaflets* are linear, acute. The *flowers* are small, white or cream-color, and are disposed in dense, and many-rayed compound umbels, which are at first flat on the top and spreading, but when the seeds are formed, contract so as to present a concave cup-like surface; in the center of the umbel a sterile flower of a deep-purple color is often observed. The *general involucre* is composed of several leaves, divided into long narrow segments, nearly the length of the umbel; *partial involucre* undivided, or partly three-cleft, membranous at the edges. The *petals* are five, unequal, and cordate. *Fruit* small, pale dull brown, oval. *Mericarps* with the primary ribs filiform, bristly, three near the middle of the convex back, and two on the plane of the commissure. *Secondary ridges* deeper and irregularly split into setaceous lobes. *Vittæ*, one under each secondary ridge, and two on the plane of the commissure.

History.—The wild carrot is a native of many parts of Europe, and is extensively naturalized in the United States, growing in neglected fields and by road-sides, and flowering from June to September. The well known Garden Carrot is the same plant, somewhat altered by cultivation. The root of the wild variety, and the seeds of both kinds are officinal. The *seeds*, or more strictly speaking, the *fruit*, are light, of a dull-brownish color, an oval shape, convex and bristly on one side, and flat on the other, presenting on their convex face four longitudinal ridges, with stiff hairs or bristles attached; they have an aromatic odor, and a warm, pungent, bitterish taste. Their virtues depend upon a volatile oil of a pale-yellow color, and which may be obtained by distillation. Boiling water extracts their active properties, which, however, is lost by decoction.

The *root* is fusiform, slender, whitish-yellow, hard, coriaceous, branched, possessing a peculiar aromatic odor, and a bitter, acrid, disagreeable taste. The root of the cultivated variety is reddish, succulent, thick, conical, rarely branched, of a pleasant somewhat aromatic odor, and a sweet, mucilaginous, peculiar taste. The root contains crystallizable and uncrystallizable sugar, starch, extractive, gluten, albumen, volatile oil,

pectin, malic acid, saline matters, lignin, and a peculiar, crystallizable, ruby-red, neuter principle, tasteless and inodorous, called Carotin.

Pectin or vegetable jelly exists more or less in all vegetables; it may be separated from the juice of fruits by alcohol, which precipitates it in the form of jelly; this being washed with weak alcohol and dried, yields a semi-transparent substance somewhat resembling isinglass. When placed in one hundred parts of cold water, it swells, and forms a homogeneous jelly. Cold water acts upon it much better than boiling. A fixed alkali or an alkaline earthy base converts it into pectic acid, which unites with the base, forming a pectate. Another acid being added, decomposition ensues, the last acid unites with the base, separating the pectic acid. Pectic acid is in the form of a colorless jelly, gives acid reactions, forms salts with the alkalies, and insoluble salts with the earths and metallic oxides.

Properties and Uses.—Both the root and seeds are stimulant and diuretic. Used in infusion with much success, in dropsy, chronic nephritic affections, and gravel. Also as a carminative, and to relieve strangury from cantharides. Externally, scraped or grated, it forms an excellent application as a poultice to phagedenic, cancerous, malignant and indolent ulcers—relieving the pain, correcting the fetor, lessening the discharge, and altering the morbid condition of the parts. Dose of the infusion, from two to four fluidounces, three or four times daily.

Off. Prep.—Cataplasma Dauci; Infusum Dauci.

DELPHINIUM CONSOLIDA.

Larkspur.

DELPHINIUM STAPHISAGRIA.

Stavesacre.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Trigynia.

THE ROOT AND SEEDS.

Description.—*Delphinium Consolida* is an annual herbaceous plant, with an erect, slightly pubescent, cylindrical, divaricate stem, from one to two feet high; root simple, slender. The leaves are sessile, and divided into numerous linear, acute segments, usually bifurcate at the summit. The flowers are bright-blue or purple, and disposed in loose, few-flowered, terminal racemes, on rigid peduncles which are furnished with two small, alternate bracts. The nectary is one-leaved, with an ascending anterior spur, about the length of the corolla. Carpels follicular, solitary, smooth, containing numerous black, or blackish-brown, angular, hirsute seeds.

Delphinium Staphisagria is a handsome annual or biennial plant, one or two feet high, with a simple, erect, downy stem. The leaves are

broad, palmate, five or seven-lobed, on hairy petioles. The *flowers* are bluish-gray, in terminal loose racemes, with hairy pedicels twice as long as the flower, and bracts inserted at their base. The *nectary* is four-leaved, and shorter than the petals, which are five in number, dirty-white, the two lower spatulate, the uppermost projected backward so as to form a spur, which incloses two spurs of the upper leaflets of the nectary. *Capsules* three, large, villous, containing many globose, three-cornered, thick, black *seeds*.

History.—The *Delphinium Consolida* is a native of Europe, which has become naturalized in the United States, growing in woods and fields, and flowering in June and July: when wild the flowers are blue, but when cultivated, are of various colors, as red, white, blue, etc. The finest flowers are obtained from seed sown late in summer, or in the beginning of autumn. All parts of the plant are endowed with a bitter, acrid principle, which is most strongly developed in the seeds, which also contain much oil. The flowers furnish, by expression, a blue pigment, which is permanent if alum be used as a mordant. Diluted alcohol is its best solvent.

The *D. Staphisagria* is a native of the south of Europe, growing in waste places; the seeds are the officinal part. They are about the size of a grain of wheat, irregularly triangular, wrinkled, externally black or brown, internally whitish and oily, with a slight, unpleasant odor, and a very acrid, bitter, hot, nauseous taste. Their virtues are extracted by water or alcohol.

The seeds of the *D. Consolida* contain *delphinia*, volatile oil, fixed oil, gum, resin, chlorophylle, gallic acid, and salts of potassa, lime and iron. Those of the *D. Staphisagria* contain a brown and a yellow bitter principle, a volatile oil, a fixed oil, albumen, an azotized substance, a mucilaginous, saccharine matter, mineral salts, and a peculiar alkaline principle combined with an excess of malic acid, called *Delphinia*.

Delphinia may be obtained by boiling a decoction of the seeds with magnesia, collecting the precipitate, and treating it with alcohol, which dissolves the delphinia, and yields it upon evaporation. It is white, pulverulent, inodorous, of a bitter, acrid taste, fusible by heat, and becoming hard and brittle upon cooling, slightly soluble in cold water, very soluble in alcohol and ether, and forms salts with the acids. It contains three distinct principles,—one of a resinous nature separated from its solution in diluted sulphuric acid by the addition of nitric acid,—another insoluble in ether, and termed *Staphisain*,—and a third soluble both in alcohol and ether, and considered as pure *Delphinia*.

Properties and Uses.—The *D. Staphisagria* possesses the same properties as the *D. Consolida*, but in a higher degree. In large doses they are irritant poisons; in medicinal doses the former is emetic, cathartic, and narcotic, but its action is too violent and uncertain for these

indications. An infusion of the seeds of *Stavesacre*, may, however, be advantageously used both by the mouth, and in injection, as a vermifuge. Powdered and mixed with lard, the seeds have been found useful in some forms of cutaneous disease, and to destroy lice in the hair; a tincture, or infusion of the bruised seeds in vinegar may be employed for the same purpose. The seeds have likewise been used in some countries to intoxicate fish.

The flowers of the *D. Consolida*, are considered diuretic, emmenagogue, and vermifuge; they were formerly used as a local application to wounds, and the decoction was recommended as efficacious in some ophthalmic affections. The seeds possess similar properties with those of the *D. Staphisagria*, but less energetic. A tincture of them has been recommended in calculus, as a vermifuge, and to destroy lice in the hair; it has also been found useful in spasmodic asthma and dropsy. It may be prepared by macerating an ounce of them in a pint of diluted alcohol; the dose is ten drops gradually increased until some effects upon the system are produced. The root possesses similar virtues but is seldom employed. A drachm of two of the flowers of *D. Consolida*, placed in a pint of hot water, and slowly simmered down to half a pint, then strained and sweetened, is said to be an excellent remedy for cholera morbus; to be administered in teacupful doses, at short intervals, until relief is obtained. As an antiemetic in the vomiting of autumnal fevers and other diseases, this plant is highly extolled, calming the stomach speedily, and giving a delightful relief; it is used in infusion, made similar to the above, by adding half an ounce of the leaves and flowers to half a pint of boiling water. The dose is a wineglassful, to be repeated every half hour or oftener, if necessary. This plant undoubtedly deserves further investigation.

Delphinia possesses the peculiar properties of the seed in an eminent degree. It is very poisonous exerting its effects chiefly on the nervous system; six grains of it dissolved in vinegar killed a dog in forty minutes,—the symptoms are vomiting, giddiness, and convulsions. Dr. Turnbull states that pure *delphinia* may be given in doses of half a grain, to the extent of three or four grains a day, without any unpleasant results; it sometimes purges, mostly promotes diuresis, and occasions feelings of heat and tingling in various parts of the body. If used at all, it should be with excessive caution. Externally, it has been successfully used in neuralgia, rheumatism, and paralysis; it is applied by friction over the part in the form of ointment or alcoholic solution, in proportions varying from ten to thirty grains of *delphinia* to one ounce of the vehicle; and the friction should be continued till some redness and burning are produced.

DIERVILLA CANADENSIS.

Bush Honeysuckle.

Nat. Ord.—Caprifoliaceæ. Sex. Syst.—Pentandria Monogynia.

ROOT, LEAVES AND TWIGS.

Description.—This plant, the *Diervilla Trifida* of Mænchausen, and sometimes called *Gravelweed*, is a low shrub, with a branching, pithy, stem, about two or three feet high. The leaves are from two to four inches long, by one to one and a half broad, ovate, acuminate, finely serrate, opposite, deciduous, on short petioles. The peduncles are axillary and terminal, dichotomous, and from one to three-flowered; flowers greenish-yellow. The calyx tube oblong, limb five-cleft, with two bracts; corolla twice as long as the calyx, greenish-yellow, five-cleft, funnel-shaped; border five-cleft, spreading. Stamens five, which with the style are much exserted. Stigma capitate. Capsule oblong, alternate above, two-celled, naked, with many seeds.

History.—This is a woody shrub, growing in the United States from Canada to Carolina, in hedges and thickets, and by the sides of fences and rocks, flowering in June. The leaves, twigs, and roots are the parts used, and yield their properties to alcohol, and boiling water in infusion.

Properties and Uses.—Diuretic, astringent, and alterative. A cold infusion of the bruised leaves and twigs, used freely, has been very beneficial in inflammation of the bladder with gravelly deposit in the urine, in nephritic and calculous affections, and in gonorrhea. The root is said to be a superior article, in decoction or syrup, for the cure of syphilis. Externally, applied to erysipelas, or erysipelatous inflammations, and over the inflamed surface occasioned by the *rhus*, ivy or poison vine, it soon relieves the itching, burning, inflammation and swelling.

Off. Prep.—Infusum Diervillæ.

DIGITALIS PURPUREA.

Foxglove.

Nat. Ord.—Scrophulariaceæ. Sex. Syst.—Didynamia Angiospermia.

THE LEAVES.

Description.—Foxglove is an elegant plant with a biennial, whitish, fibrous root, which in the first year sends up large tufted leaves, and in the following summer, a single, erect, wand-like, roundish with several slight angles, downy and leafy stem, rising from two to five feet in height, and terminating in a spike of purple flowers; the lower leaves are ovate, acuminate, rugose, crenate, downy, especially on their under surface, veined, of a dull-green color above and paler beneath, tapering at the

base into short, winged petioles, about eight inches in length and three in breadth, and spreading on the ground; the *upper* or *cauline* ones are alternate, elliptic-oblong, somewhat decurrent, and in other respects like the former. The *flowers* are very numerous, large, pendulous, scentless, on short peduncles, and are arranged in a long, erect, one-sided, terminal spike. At the base of each peduncle is a sessile, ovate, and acuminate floral leaf. The *calyx* is divided into five segments, rounded or acute, much shorter than the corolla, of which the uppermost is the narrowest. The *corolla* is monopetalous, campanulate, spotted within as well as hairy, inflated on the lower side, and narrowed at base, the upper lip somewhat cleft, emarginate, and smaller than the lower. The *stamens* are didynamous, subulate, inserted into the base of the corolla, declined, white, supporting large, oval, acute, deeply-cleft, naked anthers. The *ovary* is pointed, ovate, having a simple style, with a bifid stigma. The *capsule* is ovate, acuminate, two-celled, two-valved, with a septicial dehiscence, and containing numerous small, oblong, pale-brown, pitted seeds.

History.—Foxglove is a native of the temperate parts of Europe, where it grows wild, and is cultivated in this country; it flowers in June and July. The leaves and the seeds are active, though the former are the officinal parts. The full grown and perfectly fresh leaves are gathered in the second year about the period of inflorescence, the petioles and midrib being rejected, and are then dried by exposure to a current of dry air, by being placed in a drying-stove, or by being inclosed in a hot-air press. Much care is necessary in preserving them for medical purposes, or else they will prove inefficient. When well prepared, the powder has a fine green color, and retains the intense bitterness of the fresh leaves. The dried leaves or the powder should constantly be kept in well-closed, opaque vessels, so as to exclude light and moisture. Age deteriorates its virtues, consequently the drug should be renewed yearly. The compact masses of digitalis prepared by the Shakers, are seldom of good quality, being much disposed to moldiness; but when free from this they may be used with advantage, if recently prepared. We consider this, however, a very objectionable mode of preserving this, as well as many other, agents. In the fresh state, foxglove has but little smell, but when dried emits a faint, narcotic odor; the fresh juice has a faint, mawkish smell, and is easily evaporated spontaneously without undergoing decomposition, forming a firm, elegant extract. The taste of the leaves and juice is intensely bitter, nauseous, and permanent. The dried leaf is of a dull, pale-green color, with a whitish down on its under surface; the powder is of a fine deep green. Water, alcohol, ether, or diluted acids take up its virtues. A solution of sesquichloride of iron added to infusion of digitalis, renders it dark-greenish-black—tincture of galls causes a gray precipitate; when triturated with lime, the leaves give out ammonia. Digitalis contains a

volatile oil, a fatty matter, a red coloring substance similar to extractive, chlorophylle, albumen, starch, sugar, gum, lignin, salts of potassa, and lime, digitalic acid, volatile antirrhinic acid, and a neutral, energetic principle, upon which its properties chiefly depend, called *digitalin*. Dr. Morries obtained a narcotic empyreumatic oil by the destructive distillation of the leaves.

Digitalin may be prepared as follows:—First, prepare an alcoholic extract, by making a paste of the coarsely powdered leaves with rectified spirit, expressing the solution, and distilling off the spirit—this extract is to be treated with distilled water acidulated with acetic acid, and heated to about 110° F., a little animal charcoal being added. To the liquor, filtered, and partially neutralized by ammonia, a fresh concentrated infusion of galls is gradually added, so long as a precipitate is produced. This precipitate, which is tannate of digitalin, is obtained separate by decanting the liquid, washing it with pure water mixed with a little alcohol, and then rubbing it in a mortar, with one-third of its weight of very finely-powdered litharge. The mixture is gently heated, and submitted to the action of twice its volume of alcohol at about 90°. The alcoholic solution is treated with a little animal charcoal, filtered, and evaporated at a very gentle heat. The residue is acted on twice or three times with cold sulphuric ether, which removes impurities and leaves the digitalin. This may be powdered, or obtained in small scales by dissolving it in the least quantity of alcohol, and allowing the concentrated solution to evaporate in a stove upon plates of glass. One hundred parts of the leaves yield about one part of digitalin. It is white, inodorous, crystallizing with difficulty, intensely bitter, sternutatory when powdered, slightly decomposed at a boiling heat, soluble in about two thousand parts of cold water, more soluble in boiling water, which retains one part in one thousand when it cools, very soluble in alcohol, slightly soluble in ether, incapable of precipitating salts, neutral, and devoid of nitrogen. It prevents fermentation in an aqueous solution of sugar, and is probably a poison to beer-yeast. With tannic acid it forms an insoluble compound; to concentrated muriatic acid it imparts a fine emerald-green color. The seeds are preferable to the leaves, as they contain a larger amount of digitalin, and can be better relied upon as to time of collection, preserving, etc.

Properties and Uses.—In single large doses, digitalis is an irritant-narcotic poison, producing, nausea, vomiting, stupor or delirium, purging, cold sweats, extreme prostration of strength, a slow, feeble, irregular pulse, hiccough, suppression of urine, coma, convulsions, and death. In doses sufficient to bring the system under its immediate influence, it causes an augmented and permanent flow of urine, reduces the pulse to forty or even thirty beats in a minute, with languor, nausea, occasionally anxiety and salivation, a sense of weight or constriction and dull pain in the head, giddiness, dimness of vision, and more or less confusion of the

mental faculties; occasionally it gives rise to irritation of the pharynx, larynx, trachea and esophagus, with hoarseness. And if the use of the remedy be persisted in, these effects will continue to increase, until the poisonous symptoms, first referred to, become developed. In medicinal doses, foxglove is sedative and diuretic, and may be employed with advantage in febrile diseases, acute inflammations, neuralgia attended with irritative fever, hemoptysis, palpitation of the heart, mania, epilepsy, pertussis, and spasmodic asthma. As a diuretic, in dropsy connected with diseased heart or kidneys. It should always be used with care, as it will sometimes act suddenly with an accumulated influence, and endanger the life of the patient. When its effects begin to appear, its use should be suspended for a time, as it is very permanent in its action, and if its sedative effect is too great, it is best counteracted by the use of wine and opium conjointly. Dose of the powder from one to three grains; of the tincture from ten to twenty minims, either being repeated two or three times daily, and gradually increased until some effect is produced upon the head, stomach, pulse, or kidneys, when it should be diminished, or entirely omitted.

The poisonous effects of digitalis are best counteracted by first evacuating the stomach by the free use of warm liquids, if any of it is supposed to remain in the stomach, and then administering brandy, wine, ammonia, or other stimulants, with sinapisms to the wrists and ankles.

Digitalin produces similar effects on the system with digitalis, but its internal employment is hazardous, and requires great caution. If given at all, it should be commenced with the fiftieth of a grain, and gradually and cautiously increased to an amount not to exceed the twelfth of a grain.

Off. Prep.—Tinctura Digitalis.

DIOSCOREA VILLOSA.

Wild Yam.

Nat. Ord.—Dioscoreaceæ. *Sex. Syst.*—Dioecia Hexandria.

THE ROOT.

Description.—This plant, sometimes called *Colic-root*, is a delicate, twining vine, with a perennial root, from which proceeds a smooth, woolly, reddish-brown stem, one or two lines in diameter, and from five to fifteen feet long. The leaves are from two to four inches long, about three-fourths as wide, mostly alternate, occasionally nearly opposite or verticillate in fours, broad-ovate, distinctly cordate and acuminate, nine to eleven-veined, margin entire or wavy, villose with short, soft hairs on the lower surface, and glabrous on the upper. The petioles are elongated, the lowest somewhat verticillate in fours, the next subopposite, the middle and upper alternate, and from two to four. The flowers are

diœcious, very small, of a pale-greenish yellow color, and in axillary panicles or racemes. The *sterile flowers* have six stamens inserted on the base of the divisions of the six-parted perianth; *anthers* introrse, with the spikes paniculate; the fertile flowers have the ovary adherent, with three styles, and simple spikes. *Peduncles* axillary. *Ovaries* at first elliptic, but finally almost as broad as long, about three-fourths of an inch in length, three-celled, loculicidally three-valved by splitting through the winged angles. *Seeds* one or two in each cell, flat, with a membranaceous margin.

History.—This is a slender vine, twining over bushes and fences, in thickets and hedges, and flowering in June and July. It is a native of the United States and Canada, being, however, more common southward, and rare in the New England States. The root is the officinal part; it is long, woody, contorted, from an eighth to a fourth of an inch in diameter, with many fine, long, scattering fibers, of a light, brownish-yellow color externally, and whitish internally, with a granular fracture, almost smooth, inodorous, except when bruised, then it emits a faint peculiar smell, and a not unpleasant, slightly bitter, sweetish and pungent taste. Water or alcohol are its solvents. No analysis has been made of this root, further than to extract its active constituent, *dioscorein*.

Properties and Uses.—Antispasmodic. Successfully used by Eclectics in bilious colic in doses of half a pint of the decoction, repeated every half hour or hour; in fact, no other agent seems necessary in this disease, as it gives prompt and permanent relief in the most severe cases. It will likewise allay nausea, also spasms of the bowels, and, combined with equal parts of the bark of *Cornus Sericea* in decoction, is eminently beneficial in the nausea and vomiting of pregnant women. In ordinary cases the decoction of the root may be given in doses of from two to four fluidounces, and repeated every half hour until relief is obtained. The tincture is said to be a valuable expectorant and diaphoretic, and in large doses produces emesis. Dose of the tincture from twenty to sixty drops.

Off. Prep.—Decoctum Dioscoreæ; Dioscorein.

DIOSCOREIN.

THE RESINOID PRINCIPLE OF THE ROOT OF DIOSCOREA VILLOSA.

Preparation.—Make a saturated tincture of the powdered roots of *Dioscorea Villosa*, and filter; add the tincture to its weight of water, and carefully distil off the alcohol; the dioscorein will be left behind in the water; collect, dry, and pulverize it. It is prepared similarly to Cimicifugin, Leptandrin, Podophyllin, etc.

History.—The profession are indebted to W. S. Merrell for the preparation and introduction of this highly valuable agent; it having been

discovered by him in the winter of 1852-3. It forms a light yellowish-brown powder of a faint smell, and a slightly sweetish, resinous, very bitter, disagreeable taste, with a persistent acidity which is very sensibly felt in the throat and fauces. When exposed to the atmosphere it absorbs moisture, becomes darker colored, tenacious, of a pilular consistence, and leaves a light-yellowish greasy stain on white paper in which it is kept. It has neither acid nor alkaline reactions. When first prepared it is wholly soluble in alcohol, but on keeping for a time is only partially dissolved; in this respect it resembles podophyllin and several other resinoids, which, though completely taken up by alcohol at first, become less soluble in this menstruum by age; probably owing to an oxidizing of the resinoid by the action of the atmospheric oxygen. It is partly soluble in water, and insoluble in oil of turpentine. Ether very slightly dissolves it, and ammonia added to the ethereal mixture forms a dark-reddish turbid solution, with the ether floating on the top of a light straw color. Chloroform produces with it a dark, muddy solution, which becomes light brown on the addition of ammonia, and if permitted to stand for ten or fifteen minutes, the mixture divides into four separate layers, the upper one being clear and of a dark wine color, the next turbid and light brown, the third saponaceous and whitish-yellow, and the lower one being a clear yellowish-white liquid. By rubbing with diluted muriatic acid it forms a liquid which, on standing, throws down a yellowish-white precipitate, the supernatant liquor being clear and transparent; the same result ensues when rubbed with diluted sulphuric acid. Ammonia added to its aqueous solution forms a light straw-colored, saponaceous fluid, with a very small precipitate of a dark color. Rubbed with sulphuric acid it becomes of a dark brownish-red color, and partially dissolves; with nitric acid, it becomes light yellowish-red; with muriatic acid, whitish-yellow; with acetic acid a light straw color, and partially dissolves; ammonia or liquor potassa forms an amber color with it. Dioscorein should be kept in bottles well-stopped; if it is desired to form pills of it, exposure to the atmosphere will produce the proper tenacity for this purpose.

Properties and Uses.—Dioscorein possesses the properties of the crude root in an eminent degree, and is undoubtedly as much a specific in bilious colic, as quinia is in intermittent. In a severe case of bilious colic pronounced past hope by several physicians, four grains rubbed up with a tablespoonful of brandy afforded prompt relief, and a repetition of the dose, in about twenty minutes from the time of taking the first, effected a cure. In ordinary cases one or two grains of dioscorein may be administered every five, ten, or twenty minutes, according to the urgency of the case. In flatulence, borborygmi, etc., it may be advantageously combined with ginger, aletrin, or asclepidin; in many forms of uterine disease its union with cimicifugin, senecin, caulophyllin, etc., will prove very useful; and it may be combined with the extract of

cornus sericea, to overcome the nausea and vomiting of pregnant females. In cramp of the stomach, or painful spasmodic affections of the bowels, a pill or powder composed of equal parts of dioscorein, caulophyllin, and viburine, will be found a remedy of great value, as well as in after-pains; the mixture should be given in three or four-grain doses, and repeated every half hour or hour. It is strictly an Eclectic remedy of great value, and not hitherto employed by practitioners of other schools. Dose of dioscorein, from one to four grains, repeated as circumstances require.

DIOSPYROS VIRGINIANA.

Persimmon.

Nat. Ord.—Ebenaceæ. *Sex. Syst.*—Dioecia Octandria.

THE BARK AND UNRIPE FRUIT.

Description.—This is an indigenous tree from twenty to sixty feet in height, with a trunk sometimes twenty inches in diameter, more especially in its southern locations, covered with a rugged blackish bark, and having alternate, spreading branches. The *leaves* are alternate, oval or oblong, acuminate, with an entire margin, smooth and shining above, paler beneath with reticulated veins, on short, pubescent petioles, and from three to five inches long. The *flowers* are obscure, pale-greenish yellow, lateral, axillary, mostly solitary, nearly sessile, the male and female flowers being on different trees, though sometimes a perfect flower occurs, in which the stamina are double the number of the segments of the calyx, and the stigmas equal to these segments. The *filaments* are short, free, or inserted on the calyx, with bilobate anthers. The *ovary* is globular, supporting a very short style, with obtuse, spreading stigmas. The *fruit* is a round, dark-yellow or orange berry, containing a fleshy, edible pulp, and from six to eight compressed, hard seeds.

History.—This is a well known indigenous tree, common to the Middle and Southern States, which flowers in May or June, but does not ripen its fruit till the middle of autumn. It is seldom found above the forty-second degree of north latitude. The unripe fruit is very astringent, but when matured, and after having been touched by the frost, it is sweet and palatable. The bark is also astringent, and together with the fruit, form the officinal portions of the tree. The unripe fruit contains tannic acid, sugar, malic acid, coloring matter, and lignin; when ripe the tannic acid almost disappears, while the sugar and malic acid increase in quantity. The bark, probably contains tannic and gallic acids. Water, spirit, or alcohol extracts the virtues of the bark and unripe fruit.

Properties and Uses.—Tonic and astringent. The bark has been used in intermittents, and both it and the unripe fruit have been beneficial in

various forms of disease of the bowels, chronic dysentery, and uterine hemorrhage; used in infusion, syrup, or vinous tincture, in the proportion of one ounce of the bruised fruit to two fluidounces of the vehicle, and half a fluidounce or more given to adults, and a fluidrachm or more to infants. The infusion may be used as a gargle in ulcerated sore-throat. The ripe fruits are very grateful and healthy, and as they ripen at a time when most other autumnal fruits have disappeared, the tree should be cultivated; for if it should improve in the same ratio as the peach, plum, etc., it would form a very valuable addition to our fall fruits. A pleasant beer is made with the ripe fruit, hops, water, and yeast; and a species of brandy is obtained by distillation of the fermented infusion.

DIRCA PALUSTRIS.

Leatherwood.

Nat. Ord.—Thymelacææ. *Sex. Syst.*—Octandria Monogynia.

THE BARK.

Description.—This is an indigenous shrub, known by the various names of *Moosewood*, *American Mezereon*, and *Wicopy*, and attains the height of five or six feet, having crooked, jointed, and spreading branches. The leaves are alternate or scattered, nearly sessile, ovate, entire, rather acute, downy when young, smooth and membranous when fully grown, pale beneath, and not appearing till long after the flowers. The flowers are in threes, on cohering peduncles, small, axillary, yellow, and funnel-shaped; when young they are inclosed within a small, dark, hairy bud, occupying a sheath or cavity in the end of each flowering branch. *Calyx* eight-toothed, yellow, funnel-shaped, half an inch long, border dilated, drooping, and contracted at the middle and base. *Corolla* wanting. *Stamens* eight, much longer than the calyx, and alternately a long and a short one, with rounded anthers. *Ovary* ovate, placed obliquely, the style appearing to issue from one side; *style* filiform, curved, longer than the stamens, and terminated by an acute stigma. *Fruit*, a small, oval, red or orange-colored berry, containing a single seed.

History.—Found in most parts of the United States, but is more abundant in the Atlantic than in the Western States; it grows in shady swamps, on the banks of streams, and in low, wet places, and flowers very early in the season, April and May, when it is wholly destitute of leaves. The bark, which is the officinal part, is very fibrous, extremely tough, and difficult to pulverize. It has a nauseous odor, an unpleasant acrid taste, followed when chewed, by a flow of saliva, and imparts its properties to alcohol, and imperfectly to water, even by decoction. It has been used for making ropes, thongs, and baskets, and might be

advantageously employed in the arts, for making paper, etc. The wood is white, soft, and very brittle. No complete analysis has been made of the bark, but it appears to contain an acrid resin, a bitter extractive, mucilage, etc.

Properties and Uses.—The bark is acrid, rubefacient and vesicant when fresh; in the dose of six or eight grains it produces a sense of heat in the stomach, with vomiting, and frequently purging. Applied to the skin it slowly excites redness and ultimately vesication, and the sores caused by it are difficult to heal, frequently degenerating into obstinate and indolent ulcers. When chewed it causes much heat and pain in the mouth, followed by salivation, and has been found useful in toothache, neuralgia, and other complaints where the acrid masticatories are found to be beneficial. A decoction of the bark is expectorant and sudorific, and may be used as a substitute for mezereon. The berries are said to be emetic, narcotic, and poisonous. The bark or berries are rarely used in practice, except in the absence of better known and more efficient articles.

DORSTENIA CONTRAYERVA.

Contrayerva.

Nat. Ord.—Urticacæ. *Sex. Syst.*—Tetrandria Monogynia.

THE ROOT.

Description.—This is a caulescent plant, with a perennial, fusiform, rough, branching root or *rhizoma*; the stem is covered with spreading, green, scaly stipules. The leaves are about four inches in length, palmate, and placed upon long radical petioles, which are winged toward the leaves; the lobes are lanceolate, acuminate, coarsely serrate and gashed, occasionally almost pinnatifid. The scapes or flower-stems are radical, several inches long, and support quadrangular, and waved or plaited receptacles, which contain male and female flowers, the former having two stamens, the latter a single style. The capsule when matured, throws out the seeds with considerable force.

History.—This plant grows in Mexico, the West Indies, and Peru. The root is the officinal part; as found in the shops, it is oblong, one or two inches in length, of various thicknesses, very hard, rough, and solid, of a reddish-brown color externally, and pale within; and has numerous long, slender, yellowish fibers attached to its inferior part. It has an aromatic odor, and a warm, slightly bitter, pungent taste. Alcohol or boiling water, extracts its sensible qualities. The tincture reddens litmus paper, and yields a precipitate on the addition of water. The root has not been analyzed, but contains starch, volatile oil, resin, and bitter extractive. The root of the shops is probably derived from several

other species than the officinal, which possess similar virtues, as *D. Brasiliensis*, *D. Houstoni*, *D. Drakena*. Some writers suppose the *D. Brasiliensis*, growing in Brazil, to furnish the true root. Contrayerva, in the Spanish American language, means *antidote*, having the power to counteract the effects of poisons.

Properties and Uses.—Stimulant, tonic, and diaphoretic. Has been used in low states of fever, malignant eruptive diseases, some forms of dysentery and diarrhea, and other diseases requiring gentle stimulation. Dose of the powdered root, thirty grains. The best form of administration is the infusion. It is seldom used in this country, having been superseded by the *Serpentaria*.

DRYMIS WINTERI. (*Wintera Aromatica*.)

Winter's Bark.

Nat. Ord.—Magnoliaceæ. *Sex. Syst.*—Polyandria Tetragynia.

THE BARK.

Description.—This is a very large, evergreen, aromatic tree, varying in size from six to fifty feet high. The bark of the trunk is gray and wrinkled, and that of the branches smooth and green. The *branches* are somewhat erect, and scarred by the traces of fallen leaves. The *leaves* are alternate, oblong, obtuse, entire, quite smooth, shining, somewhat coriaceous, of a deep-green color above, pale-bluish beneath, with two caducous stipules at their base, and standing on short petioles. The *flowers* are small, sometimes solitary, frequently in clusters of three or four, and on short peduncles, which are either simple or divided a little above the base into long pedicels. The *sepals* are two or three, green, thick, coriaceous, and persistent. The *corolla* consists of seven white, obtuse, concave, erect, very caducous petals. The *filaments* are numerous, shorter than the petals, and support large, oval *anthers*, longitudinally divided by a deep fissure. The *ovary* is formed of from four to eight carpels, and is surrounded by a sessile stigma. The fruit is a thick, fleshy, ovate berry, containing many seeds.

History.—This is a very large, evergreen tree, a native of Terra del Fuego, and the southern parts of South America, and takes its name from its discoverer, Captain Winter. The bark of the tree is the part employed. It is in quills or rolled pieces of some length, of different widths and thicknesses; of a pale-yellowish, or dull reddish-gray, with darker spots externally, and of a dark-cinnamon color internally. The odor is aromatic, and the taste warm, pungent, and spicy. It contains tannic acid and oxide of iron, which serve to distinguish it from *canella alba*, with which it is often confounded.

Properties and Uses.—Stimulant, aromatic, and tonic, and may be employed in all cases in which the Canella and Cinnamon are indicated

It was highly recommended by its discoverer as an antiscorbutic. The dose of the powder is about half a drachm. It is seldom used in this country. Another species growing in Chili, *Drymis Chilensis*, yields a bark possessing analogous virtues.

EPIGEA REPENS.

Trailing Arbutus.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—This plant has several names, as *Winter-pink*, *Gravel-weed*, *Mountain-pink*, *Ground Laurel*, *May-flower*, etc. It is a small trailing plant, indigenous, with woody stems from six to twenty inches long, and is covered with a hairy pubescence in all its parts. The leaves are evergreen, alternate, cordate-ovate, entire, two or two and a half inches long, by one and a half wide, roundish at the end, and abruptly tipped with a very short point, and stand on slender petioles. The flowers are very fragrant, white or tinged with various shades of red, and are disposed in small axillary clusters on short stalks. The corolla is hypocrateriform, tube cylindrical, longer than the calyx, hairy within, limb five-parted, spreading. Calyx green, five-parted, with three large bracts at base; stamens ten with filiform filaments; anthers oblong, awnless, dehiscent by two longitudinal openings. Capsule or pod depressed globular, five-lobed, five-celled, many-seeded.

History.—This shrubby little plant grows in sandy woods, sometimes in rocky soil, in the shade of pines, and is found from Newfoundland to Pennsylvania and Kentucky; it generally prefers the sides of hills with a northern exposure. Its flowers exhale a rich, spicy fragrance, and appear in April and May. The plant is said to be injurious to cattle when eaten by them. The leaves are the official parts, and yield their properties to water or spirits. No analysis has been made of the plant.

Properties and Uses.—Diuretic and astringent. This is a very valuable Eclectic remedy, and is highly beneficial in gravel, and all diseases of the urinary organs; it is superior to the uva ursi, or foreign buchu, and where these have failed in producing benefit, this has succeeded. It may be used in the same manner and doses as the uva ursi. The fluid extract is an elegant preparation for all urinary difficulties. It enters into a very useful preparation, termed *Diuretic compound*, which see under the head of *Infusions*. It has been occasionally used with advantage in diarrhea, and bowel complaints of children. The infusion of the leaves may be drank freely.

Off. Prep.—Extractum Epigææ Fluidum; Infusum Epigææ.

EPILOBIUM ANGUSTIFOLIUM.

Willow Herb.

Nat. Ord.—Onagraceæ. *Sex. Syst.*—Octandria Monogynia.

THE LEAVES AND ROOT.

Description.—This plant, sometimes known as *Rose-bay*, is the *Epilobium Spicatum* of Lamark; it is a perennial, indigenous plant, with a simple, erect *stem* from four to six feet in height. The *leaves* are scattered, lanceolate, sessile, smooth, subentire, with a marginal pellucid vein, from two to five inches in length, and one-fourth as wide. The *flowers* are large, numerous, very showy, pink-purple, and in a long terminal spike or raceme. The *corolla* has four deep lilac-purple petals, clawed, and widely spreading. *Calyx-tube* not prolonged beyond the ovary; limb four-cleft, four-parted, and deciduous. *Stamens* eight, and as well as the *style*, turned to one side. *Stigma* with four linear, long, revolute lobes. *Ovary* and *capsule* long, linear, four-cornered, four-celled, four-valved; *seeds* numerous, with a tuft of long hairs.

History.—Willow Herb is found growing in the United States in newly cleared lands, and low waste grounds, in the northern States, flowering in July and August. The leaves and roots are the parts used, and yield their virtues to water or spirits.

Properties and Uses.—Tonic, astringent, demulcent, and emollient. An infusion of the leaves will be found beneficial in chronic diarrhea, dysentery, leucorrhea, menorrhagia, and uterine hemorrhage; and forms an excellent local application for ophthalmia, ulcerations of the mouth and throat, and leucorrhea. The leaves in poultice are a valuable remedy for foul and indolent ulcers. Dose of the infusion from two to four fluidounces, three or four times a day.

EQUISETUM HYEMALE.

Scouring Rush.

Nat. Ord.—Equisetaceæ. *Sex. Syst.*—Cryptogamia Filices.

THE PLANT.

Description.—This plant, also known by the names of *Horse Tail*, *Shave Grass*, etc., is a perennial plant, with simple, stout, erect, jointed and hollow *stems*, fourteen to twenty-six longitudinal furrows, the ridges rough with two rows of minute tubercles, and growing from two to three feet in height, each stem bearing a terminal, ovoid spike; frequently two or more stems are united at the base from the same root. The *sheaths* are from two to three lines long, and from an inch to an inch and a half apart, ashy-white, black at the base and summit, short, with subulate, black, awned, and deciduous teeth, which leave a bluntly crenate margin.

Fertile plants mostly leafless. *Fruit* placed under peltate polygons, being pileus-like bodies, which are arranged in whorls, forming a spike-like raceme; from four to seven spiral filaments surround the spores, which resemble green globules, and which roll up closely around them when moist, and uncoil when dry.

History.—The plant is common to the northern and western parts of the United States, growing in wet grounds, on river banks, and borders of woods, and maturing in June and July. They, together with other Cryptogamia abound in the fossil remains of coal measures, indicating that they were once of gigantic dimensions, and formed a large part of the original flora of our globe. The *E. Lævigatum* and *E. Robustum*, of the southern and western borders of our country, may be substituted for the above. Silix enters largely into the composition of these plants, on which account they have been used to scour, rough polish, etc. The whole plant is medicinal, and imparts its properties to water.

Properties and Uses.—Diuretic and astringent. An infusion drank freely has been found beneficial in dropsy, suppression of urine, hematuria, gravel, and nephritic affections; and has also been used with advantage in gonorrhea and gleet. The ashes of the plant are very valuable in dyspepsia connected with obstinate acidity of stomach, and may be given alone, or combined with powdered resin, or hydrastin, etc. Dose of the pulverized ashes from three to ten grains, to be repeated three or four times daily.

ERECHTHITES HIERACIFOLIUS.

Fireweed.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE ROOT AND HERB.

Description.—This plant is the *Senecio Hieracifolius* of Linnæus; it has an annual, herbaceous, grooved, thick, fleshy, branching, virgate, panicled, and roughish *stem*, from one to five or even eight feet high. The *leaves* are simple, alternate, large, lanceolate or oblong, acute, unequally and deeply toothed with acute indentures, sessile, and light-green; the upper ones often with an auricled clasping base. The *flowers* are whitish, terminal, crowded, and destitute of rays. *Involucre* smooth, large, tumid and bristly at the base. *Achenia* oblong, hairy.

History.—This is an indigenous, rank weed, growing in fields throughout the United States, in moist woods, and in recent clearings, especially and abundantly in such as have been burned over. It flowers from July to October, and somewhat resembles in appearance the Sowthistle, *Sonchus Oleraceus*; the flowers somewhat resemble those of Lettuce. The whole plant is officinal, and yields its virtues to water or alcohol. It has a peculiar, aromatic and somewhat fetid odor, very unpleasant to many

persons, and a peculiar, slightly pungent, bitterish, rather disagreeable taste, with some astringency. These properties appear to depend upon a volatile oil, which may be obtained from the plant by distillation with water, and which possesses in an eminent degree the taste and odor of the plant, and which is very persistent; it is of a light-yellowish color.

Properties and Uses.—Fireweed is reputed to be emetic, cathartic, tonic, astringent and alterative, of which the most valuable are the latter three. Reputed an unrivaled medicine in diseases of the mucous tissues of the lungs, stomach, and bowels. A spirituous extract of the plant has been highly recommended by Dr. A. R. Wyeth, of Pennsylvania, in the treatment of cholera and dysentery, in the latter disease promptly arresting the muco-sanguineous discharges, relieving pain, and effecting a speedy cure. In the summer complaint of children, he has found it to prove almost invariably successful, even in cases where other means had failed.

Off. Prep.—Infusum Erechthites; Oleum Erechthites.

ERIGERON CANADENSE.

Canada Fleabane.

Nat. Ord.—Asteraceæ, or Compositæ Asteroideæ. (*De Candolle.*) *Sex. Syst.*—Syngenesia Superflua.

THE WHOLE PLANT.

Description.—This plant is known by the various names of *Colt's-tail*, *Pride-weed*, *Scabious*, *Horse-weed*, *Butter-weed*, etc. It is an indigenous annual plant, with a high, branching, furrowed, and bristly-hairy stem, from six inches to nine feet in height. The leaves are linear-lanceolate, ciliate; lower ones subserrate. The flowers are very small, numerous, white, irregularly racemose upon the branches, and constituting a large, terminal, oblong panicle. *Involucre* cylindric; *rays* minuté, numerous, crowded, short; *pappus* simple.

History.—This plant is common to the northern and middle portions of the United States, growing in fields and meadows, by road-sides, and in waste places, and flowering in July and August. It differs from the other species of *Erigeron*, in having an oblong calyx, very minute rays and more numerous than the disk-florets, and the pappus simple. Hence, Nuttall has placed it in a subgenus, named *Canotus*. A variety of the *E. Canadense* is the *E. Pusillum*, growing from four to six inches high, with an erect, smooth stem, less branched than the above, all its leaves are entire, and scabrous on the margin; the panicle is simple, and the peduncles filiform, nearly naked, divaricate, each bearing two or three flowers.

The whole plant is officinal and should be collected while in flower. It has a feeble but agreeable odor, and a bitterish, acrid and astringent taste, and yields its properties to water or alcohol. Boiling diminishes

its acrimony, in consequence of the escape of the volatile oil. Analysis has found in it, bitter extractive, tannin, gallic acid, and an astringent volatile oil, which may be procured by distillation with water.

Properties and Uses.—Tonic, astringent, and diuretic. The infusion has been found efficient in diarrhea, gravel, diabetes, dropsical affections, dysury of children, painful micturition, and in many nephritic affections. It may be given in the form of powder in doses of half a drachm, or a drachm; or the infusion, which is the best form of administration, may be given in doses of from two to four fluidounces, three or four times a day; the aqueous extract is worthless, but the fluid extract may be given in teaspoonful doses.

The volatile oil of *E. Canadense* acts as an astringent, and may be used as a local application to hemorrhoids, bleedings from small wounds, etc., likewise in rheumatism, boils, tumors, and sore-throat, in which it should be combined with goose oil or some similar substance, being too acrid to use alone. Internally, it will be found useful in diarrhea, dysentery, hemoptysis, hematemesis, and hematuria; from four to six drops of it on sugar, or dissolved in alcohol, and given in a little water, will be found a powerful remedy in uterine hemorrhage and menorrhagia, acting promptly and efficaciously; it may be repeated every five or ten minutes if required.

Off. Prep.—Infusum Erigeroni; Oleum Erigeroni.

ERIGERON HETEROPHYLLUM.

Various-leaved Fleabane.

ERIGERON PHILADELPHICUM.

Philadelphia Fleabane.

Nat. Ord.—Asteraceæ, or Compositæ-Asteroidææ. (*De Candolle.*) *Ser.*
Syst.—Syngenesia Superflua.

THE WHOLE PLANT.

Description.—The *Erigeron Heterophyllum* is the *E. Annuum* of Persoon, and many other celebrated Botanists, and which name will probably be hereafter generally adopted. It is a biennial, herbaceous plant, with a branching root, from which proceed several erect, roundish, thick, striate stems, hispid with scattered hairs, branching, and growing from three to five feet in height. The *lowest* or *radical leaves* are ovate, acute, deeply-toothed, contracted at base, and on long, winged petioles; the *upper* or *stem leaves* are lanceolate, acute, deeply serrate in the middle, and sessile; the *floral* or *branch leaves* are lanceolate, entire, sessile; all are ciliate at the base, except those from the root. The *flowers* are in large terminal, rarely lateral corymbs, numerous; *disk-florets* yellow, *ray-florets* capillary, white or pale-blue. *Pappus* plainly

double, the outer a crown of minute chaffy-bristle-form scales; the inner of scanty capillary bristles which are deciduous, or entirely wanting in the ray. This plant is common to the United States and Europe, being a very common weed in fields and waste grounds from Canada to Pennsylvania and Kentucky, and flowering from June to August.

The *Erigeron Philadelphicum* is the *E. Strigosum* of Willdenow, and the *E. Purpureum* of Aiton. It is a perennial, herbaceous plant, with a branching, yellowish root, and from one to five erect, slender, branched stems, which rise from one to five feet in height. The lower leaves are ovate, lanceolate, nearly obtuse, ciliate on the margin, entire or marked with a few serratures, and on long petioles; the upper leaves are narrow, oblong, somewhat wedge-shaped, obtuse, entire, sessile, and slightly embrace the stem; the floral leaves are small and lanceolate. The flowers are very numerous, radiate, and disposed in a paniced corymb, with long peduncles bearing from one to three flowers. The rays are conspicuous, very narrow, rose-purple or flesh-color, twice as long as the hemispherical involucre. Pappus simple. The whole herb is pubescent. This plant is found growing in common with the preceding variety, flowering at the same period.

History.—These plants are identical in their medical properties, and are employed indiscriminately; they differ from the *E. Canadense* in being less astringent and more diuretic. The whole herb is employed, and should be collected while in flower. They have a peculiar, aromatic odor, and a slightly bitter and astringent taste, and impart their properties to boiling water in infusion. They have not been analyzed, but yield, on distillation, a pale-yellow, acrid, styptic volatile oil, resembling that of the *E. Canadense*.

Properties and Uses.—Diuretic, astringent, and tonic. The infusion is very efficacious in affections of the bladder and kidneys, dysury, especially of children, painful micturition, various forms of dropsy, gravel, and in hydrothorax complicated with gout. It has also been recommended as a diaphoretic in rheumatism, fevers, colds, etc., and as an emmenagogue in suppressed menstruation; and has been used with advantage in gout, some forms of cutaneous eruptions, and diabetes. Dose of the infusion, from two to four fluidounces, three or four times a day.

ERYNGIUM AQUATICUM.

Water Eryngo.

Nat. Ord.—Apiaceæ, or Umbelliferae. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This plant, also called *Button Snakeroot*, *Rattlesnake's Master*, etc., is an indigenous herbaceous plant, with a perennial tuberous root, and a stem nearly simple, growing from two to six feet, according

to the soil, generally branching by forks, but trichotomous above. The *leaves* are from one to two feet long, and from half an inch to an inch and a half wide, linear-lanceolate on the upper part of the stem, sword-shaped below, parallel-veined, ciliate with remote soft spines upon their margins. *Bracts* tipped with spines, those of the involuclers entire, shorter than the heads. The *flowers* are white or pale, inconspicuous, and disposed in ovate-globose heads, which are pedunculate, and from half an inch to an inch in diameter. *Calyx* five-parted, permanent; *styles* slender; *petals* connivent, oblong, emarginate, with a long inflexed point. *Fruit* scaly, top-shaped, bipartite.

History.—This plant is a native of the United States, growing in swamps and low wet lands, from Virginia to Texas, and especially on the prairie lands. It flowers in August. The root is the officinal part. It has a dark-brown, very knotty rhizoma, wrinkled horizontally, with many fibers of the same color, growing downward, furrowed or wrinkled longitudinally, and from a line to a line and a half in thickness. Internally, it is yellowish-white, of a peculiar smell, somewhat resembling that of *Iris Versicolor*, and a faintly sweetish, mucilaginous, aromatic taste, succeeded by bitterness, some degree of pungency affecting the fauces, and a very slight astringency. It is easily pulverizable. Water or spirit extracts its properties. It has not been analyzed but is worthy attention.

Properties and Uses.—Diuretic, stimulant, diaphoretic, expectorant, and, in large doses, emetic. Very useful in dropsy, nephritic and calculous affections, also, in scrofula and syphilis; as a diaphoretic and expectorant in pulmonary diseases. Recommended as a substitute for Senega. The pulverized root in doses of two or three grains has proved very effectual in hemorrhoids and prolapsus ani. Two ounces of the pulverized root, added to one pint of good Holland gin, has effected cures in obstinate cases of gonorrhea and gleet; to be administered in doses of one or two fluidrachms three or four times a day. By some practitioners this root is employed as a specific in gonorrhea, gleet, and leucorrhea; used internally in syrup, decoction, or tincture, and the decoction applied locally by injection. Used externally and internally, it is said to cure the bites of snakes and insects. Dose of the powder, from twenty to forty grains; of the decoction, which is principally used, from two to four fluidounces, several times daily.

Off. Prep.—Decoctum Eryngii.

ERYTHRONIUM AMERICANUM.

Adder's Tongue.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE LEAVES AND ROOT.

Description.—This plant, also known by the name of *Dog's Tooth Violet*, *Yellow Snowdrop*, *Rattlesnake Violet*, *Yellow Erythronium*, etc., is

an indigenous, perennial, bulbous plant. The *cormus* is situated deep in the ground, is brown externally, white and solid internally, and from which arises a single, naked, slender *scape*, from three to four inches in height, and two smooth, lanceolate, veinless *leaves*, nearly equal, about five inches long, one twice as wide as the other, of a dark brownish-green color, clouded with irregular brown or purplish spots, sheathing the scape with their base, and involute at the point, terminating in an obtuse, callous point. The *flower* is solitary, drooping, yellow, expanded and revolute in the sunshine, but nearly closed at night and on cloudy days. *Sepals* and *petals* oblong-lanceolate, obtuse at the point; *sepals* partly crimson on the outside; *petals* with an obscure tooth on each side near the base. *Stamens* six; *filaments* flat; *anthers* oblong-linear. *Ovary* obovate; *style* club-shaped, longer than the stamens, three-lobed at top, and terminating in three, undivided stigmas. *Capsule* oblong-obovate, stipitate, three-valved; *seeds* rather numerous, ovoid, with a loose membranaceous tip.

History.—This plant is a native of most parts of the United States, growing in shaded and somewhat moist situations, and flowering in April and May. The bulb and leaves are the parts used, and impart their virtues to water. The leaves are said to be more active than the root.

Properties and Uses.—Emetic, emollient, and antiscrofulous when fresh; nutritive when dried. The fresh roots and leaves, simmered in milk, or the fresh leaves, bruised and applied as a poultice to scrofulous ulcers or tumors, together with a free internal use of an infusion of them, is highly recommended as a remedy for scrofula. The expressed juice of the plant, infused in cider, is reputed useful in dropsy, and for relieving hiccough, vomiting and hematemesis. Twenty-five grains of the fresh root, or forty of the recently-dried root, will operate as an emetic, though this result is sometimes uncertain.

EUONYMUS ATROPURPUREUS.

Wahoo.

Nat. Ord.—Celastraceæ. *Sex. Syst.*—Pentandria Monogynia.

BARK OF THE ROOT.

Description.—This is a small shrub or bush; known by several other names, as *Indian Arrow-wood*, *Burning-bush*, *Spindle Tree*, etc., with smooth *branches*, and rising from five to ten feet in height. The *leaves* are from two to five inches in length, and about half as wide, opposite, on petioles from one-third of an inch to an inch in length, elliptic-lanceolate, mostly acute at base, finely serrate, pubescent beneath; *peduncles* opposite, slender, compressed, from an inch to two and a half inches in length, and each with a cyme of from three to six flowers. *Flowers* dark-purple, usually pentamerous. *Corolla* about two and a half lines in diameter, flat, and inserted on the outer margin of a glandular disk;

calyx flat, of four, five, or six united sepals; *stamens* five, with short filaments. *Capsule* or *pod* smooth, crimson, five-angled, five-celled, five-valved; *seeds* one or two in each cell, inclosed in a red aril.

Euonymus Americanus, is of smaller size than the preceding variety, with smooth, four-angled *branches*; the *leaves* are oval and elliptic-lanceolate, sessile, subentire at the margin, acute or obtuse at apex, smooth, coriaceous, from one-third of an inch to two inches in length, and about one-third as wide. The *peduncles* are round, longer than the leaves, and with two, three, or four flowers. *Flowers* somewhat larger than those of the preceding variety, yellow and pink; *capsule* dark-red, rough-warty, depressed, not so copious as in the former plant.

History.—There are two varieties of this plant used in medicine,—the Spindle Tree, *E. Atropurpureus*, and the Burning Bush, or *E. Americanus*, to both of which the term *Wahoo* is indiscriminately applied. They grow in many sections of the United States, in woods and thickets, and in river bottoms, and flower in June. The bark of the root is the officinal part. It has a bitter, and somewhat unpleasant taste. Water or alcohol extracts its virtues. The decoction, concentrated by evaporation, yields acicular crystals, the exact nature of which are not yet ascertained; probably an alkaloid. They are soluble in boiling water, but are deposited on cooling; soluble in oils, partly soluble in nitric acid, but insoluble in cold water, sulphuric acid and alcohol. If these should prove to be the alkaloid principle of the plant, they will be termed *Euonymia*. The Franklin Pharmaceutical Institute of N. York advertise a preparation which they call Euonymine, and state to be the active principle of *E. Americanus*. It is held to be an alterative, tonic, laxative, and expectorant. Unfortunately, we have not been made acquainted with the article, nor its method of preparation.

Properties and Uses.—These plants have been in use among Eclectics for a long time. The bark is tonic, laxative, alterative, diuretic, and expectorant; in infusion, syrup, or extract, it has been successfully used in intermittents, dyspepsia, torpid liver, constipation, dropsy, and pulmonary affections. Dose of the saturated tincture, from one to four fluidrachms; of the syrup, from one to two fluidounces; of the hydro-alcoholic extract, from five to fifteen grains; of the powder, from twenty to thirty grains. The seeds are purgative and emetic.

EUPATORIUM AROMATICUM.

White Snakeroot.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE ROOT.

Description.—This is a perennial plant, with a rough, slightly pubescent *stem*, about two feet in height, and corymbose at the summit. The

leaves are from two to four inches long, and about one half as wide, on petioles not quite an inch long, opposite, subcordate, lance-ovate, acute, three-veined, obtusely serrate, smoothish, or very slightly pubescent. *Involucre* simple, pubescent; *scales of the involucre* nearly equal and in one row. *Flowers* white, aromatic, in small corymbs; *heads* large, ten to fifteen-flowered.

History.—This is an indigenous plant, growing from Massachusetts to Louisiana, but especially throughout the middle states, and flowering in August and September. The root is the officinal part, and should be collected in September and October. It has a pleasant, aromatic odor, and a bitterish taste. Its virtues are extracted by boiling water.

Properties and Uses.—Diaphoretic, antispasmodic, expectorant and aromatic. Used in the form of infusion or decoction in fevers of a typhoid character, connected with wakefulness; also, in pleurisy and peripneumony, as a diaphoretic and expectorant. In hysteria, hypochondria, nervous irritability and flatulence, it is very beneficial. Dose of the infusion or decoction from half a fluidounce to four fluidounces. It is sometimes connected with sanguinaria and asclepias, in pulmonary diseases. Said to be valuable in gravel.

Off. Prep.—Infusum Eupatoriæ Aromaticæ.

EUPATORIUM PERFOLIATUM.

Boneset.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE TOPS AND LEAVES.

Description.—Boneset, or *Thoroughwort*, as it is also called, is an indigenous plant, with a perennial, horizontal and crooked *root*, sending up many erect, herbaceous *stems*, which are round, hairy, simple below, trichotomously branched above, of a grayish-green color, and from two to five feet in height. The *leaves* are opposite, connate or perfoliate, resembling a single leaf, centrally perforated by the stem, decussating at right angles, gradually tapering to a point, serrated, rough above, tomentose beneath, of the same color as the stalks, and both combined are from eight to fourteen inches in length; the upper leaves, and those of the branches are not joined at the base, being merely sessile. The *flowers* are white, numerous, in dense, depressed, terminal corymbs, formed of smaller, fastigiate ones. The *peduncles* are hairy. *Involucre* cylindrical, imbricated, twelve to fifteen-flowered; the *bracts* lanceolate, acute, entire, hairy. *Florets* tubular, five-toothed, with a rough, down-like pappus. *Anthers* five, deep-blue or black, united into a tube. *Style* filiform, divided into two filiform, acuminate branches, which project beyond the corolla. *Fruit* or *seeds* oblong, black, prismatic, acute at base, on a naked receptacle.

*Dysentery
Influenza.*

EUPATORIUM PURPUREUM.

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History.—This is a well-known plant, growing in low grounds, and on the margins of streams, in almost every part of the United States. It flowers in August and September. The tops and leaves are officinal. It has a faint odor, and a strongly bitter, somewhat peculiar taste. Its virtues are readily taken up by water or alcohol. No accurate analysis of the plant has been made, though its medical virtues probably reside in a bitter extractive matter, which is soluble in water and alcohol, and forms copious precipitates with the metallic salts. According to Rafinesque it contains a brown, bitter, resinous principle, termed by him, *Eupatorin*.

Properties and Uses.—This is a very valuable medicinal agent. The cold infusion, or extract, is tonic and aperient; the warm infusion, diaphoretic and emetic. As a tonic, it is useful in remittent, intermittent and typhoid fevers, dyspepsia and general debility; and combined with bitartrate of potassa and camphor, the powdered leaves have been serviceable in some forms of cutaneous disease. In intermittent fever a strong infusion, as hot as can be comfortably swallowed, is administered, for the purpose of vomiting freely. This is also attended with profuse diaphoresis, and sooner or later by an evacuation of the bowels. During the intermission, the cold infusion, or extract is given every hour as a tonic and antiperiodic. In epidemic influenza the warm infusion is valuable as an emetic and diaphoretic, likewise in febrile diseases, catarrh, colds, and wherever such effects are indicated. The warm infusion is also administered to promote the operation of other emetics. Externally, used alone or in combination with hops or tansy, etc., a fomentation of the leaves applied to the bowels have been useful in inflammation, spasms, and painful affections. Dose of the powder, from ten to twenty grains; of the extract, from two to four grains; of the infusion, from two to four fluidounces.

Off. Prep.—Extractum Eupatorii; Infusum Eupatorii; Pilulæ Aloës Compositæ.

EUPATORIUM PURPUREUM.

Queen of the Meadow.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE ROOT.

Description.—This plant, likewise known by the names of *Gravel root*, *Joe-pye*, *Trumpet-weed*, is herbaceous, with a perennial, horizontal, woody caudex, with many long, dark brown fibers, which send up one or more solid, glabrous, green, sometimes purplish stems, five or six feet in height, with a purple band at the joints, about an inch broad. The leaves are from three to six in a whorl about six inches apart, oblong-ovate, or lanceolate, pointed, rugosely or feather-veined, coarsely serrate, slightly

scabrous, with a soft pubescence beneath along the midvein and veinlets, thin, soft, on petioles an inch long, and from eight to twelve inches long by three or four inches wide. The *flowers* are all tubular, purple, varying to whitish, and consist of numerous florets contained in an eight-leaved calyx. *Heads* in lax, very dense and compound corymbs, cylindrical, and from five to ten-flowered.

History.—Queen of the Meadow grows in swamps and low grounds from Canada to Virginia, and flowers in August and September. The root is the official part; as found in the shops it consists of a blackish woody caudex, from which proceed numerous long fibers, from one to three lines in diameter; externally they are covered with a dark-brown, longitudinally-furrowed cortex, beneath which the internal portion is white, or whitish-yellow, according to its age, the last color being the oldest. It has a smell somewhat resembling old hay, and a slightly bitter, aromatic, and faintly astringent, but not unpleasant taste, and yields its properties to water by decoction, or spirits. It has not been analyzed; a principle has been obtained from it, by Mr. J. B. Robinson of Cincinnati, to which he has given the name of *Eupatorine*. It is obtained by making a saturated tincture of the root, and adding to it an equal bulk of water slightly acidulated with muriatic acid; on distilling off the alcohol the resin is precipitated. It is a dark-brown resin, forming a yellowish-brown powder, with a peculiar, slightly-aromatic, not unpleasant odor, and a peculiar, slightly-bitterish taste. It is easily pulverized, but in a short time the powder forms a solid mass, of a dark-brown-color, or if much exposed to the atmosphere, black, resembling asphaltum. Water alone, or acidulated with muriatic or sulphuric acids, does not dissolve it; but ammonia or liquor potassa added to water, dissolves it, the last forming a solution of a deep-red color, which on the addition of a few drops of muriatic acid, gives a clear, transparent liquor, with a light-yellow spongy substance floating on the surface, and which is, probably, the resin purified. It is partly soluble in alcohol, but becomes completely so on the addition of muriatic acid, to which, if water be added, a grayish milky opaque liquid is formed, which on standing, or by evaporation of the alcohol, gives a light-brown precipitate. Ether dissolves it, and if ammonia be added, a separation ensues, the ether floating above with a yellow tinge, while the ammonia sinks, forming a clear dark-red solution; if liquor potassa be added to the ethereal solution, it causes a light yellowish-red liquor above, and a dark one below. Chloroform partially dissolves it, and wholly so on the addition of ammonia, which separates the solution into a yellow fluid below, and a dark-brown liquid above. It is insoluble in oil of turpentine. The therapeutical properties of this resin are not yet understood; it remains to be determined whether or no it possesses the virtues of the root.

Properties and Uses.—A valuable diuretic, stimulant, somewhat astringent, and tonic. Used with excellent effect in dropsical affections, strangury, gravel, and all chronic urinary disorders, hematuria, gout and rheumatism. Dose of the decoction of queen of meadow, from two to four fluidounces, three or four times a day.

Since writing the above, Mr. William S. Merrell has prepared an oleo-resin from this plant, to which he has given the name of *Eupurpurin*; it may be obtained by adding the alcoholic tincture of the root, to twice its volume of water, and distilling off the alcohol, similar to the process for obtaining podophyllin, iridin, etc. It is of a thick, pilular consistence and a dark greenish-brown color, having a faint peculiar smell, and a slightly nauseous taste. It is soluble in alcohol or ether, and more speedily when these are hot; slowly soluble in oil of turpentine, from which ether precipitates the resin, holding the oily portion in solution, and on the addition of alcohol the resin is redissolved. It is almost completely soluble in dilute alkalis, but completely so, on the addition of a small quantity of ether. *Eupurpurin*, in doses of three grains, repeated every three or four hours, is a most powerful diuretic, occasioning in some instances a most enormous flow of urine. It may be given in pill form, either alone, or combined with an equal quantity of castile soap. An excellent pill for many renal affections may be made, composed of *eupurpurin* three grains, *geraniin* two grains, and extract of *nux vomica* one-tenth of a grain. Divide into two pills. One of these pills may be given every four hours daily.

Off. Prep.—Decoctum *Eupatorii Purpurei*; Infusum *Epigææ* Compositum.

EUPATORIUM TEUCRIFOLIUM. (*E. Verbenæfolium*.)

Wild Horehound.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia *Æqualis*.

THE HERB.

Description.—This is an indigenous, perennial plant, with a herbaceous, paniculate, pubescent stem, growing from two to three feet high, with fastigate, corymbose branches above. The leaves are opposite, sessile, distinct, ovate-oblong, and ovate-lanceolate, rough, veiny, the lower ones coarsely serrate toward the base, the upper ones alternate, subserrate, and often entire. Branches of the corymb, few, unequal. The flowers are small, white, composed of five florets within each calyx; scales of the involucre oblong-lanceolate, rather obtuse, at length shorter than the flowers.

History.—This plant grows in low wet places, from New England to Georgia, and is very abundant in the Southern States, flowering from August to November. The whole herb is employed; its sensible properties

are similar to boneset, but less bitter and disagreeable. Its active properties are taken up by spirits, or water by infusion. It has not been analyzed.

Properties and Uses.—Tonic, diaphoretic, diuretic, and laxative. Recommended by Dr. Jones, of Georgia, in intermittent and remittent fevers. Usually administered in infusion; one ounce of the dried leaves infused in a quart of water, of which, half a teacupful may be given every hour or two, as warm as can be comfortably drank; it will prove diaphoretic, or diuretic, according to the temperature in which the patient is kept, and likewise laxative. The cold infusion, or tincture, is tonic.

The *Eupatorium Hyssopifolium*, and *Eupatorium Leucolepsis*, both called "Justice's Weed," have been used with success for curing the bites of snakes and other poisonous animals; they were employed for this purpose by John Justice, of South Carolina, in 1800, who received a premium for disclosing his remedy.

EUPHORBIA COROLLATA.

Large Flowering Spurge.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Dodecandria Trigynia, *Linnaeus*; Monœcia Monadelphia, *Michaux*.

THE BARK OF THE ROOT.

Description.—This plant has many common names, as *Blooming Spurge*, *Milk-weed*, *Bowman's Root*, etc. It is a tall, erect plant, with a large, perennial, branching, yellowish root, from which arise several stems from two to five feet in height, round, and in most instances, simple. The leaves are scattered, sessile, oblong, obovate, or linear, entire, flat or revolute at the margin, smooth in some plants, very hairy in others, verticillate and opposite in the umbel, and from one to two inches in length. The flowers are white, and disposed upon a large, terminal umbel, with a five-leaved involucre, and five trifid or dichotomous rays, each fork being attended by two bracts and a flower. Umbel five rayed, with as many bracteal leaves. Involucre large, rotate, white, with five obtuse petal-like segments; at the base of these divisions are five interior, very small, obtuse segments. The stamens are twelve, evolving gradually, with double flowers; many flowers have only stamens. The pistil, when present, is stipitate, nodding, rounded, with three bifid styles. The fruit is a smooth, three-celled, and three-seeded capsule; seeds smooth.

History.—This is an indigenous plant, found growing in Canada and the United States, in dry, sandy, and barren soil, and flowering in July and August. When broken, it yields a milky juice, which powerfully irritates the skin when applied to it for a few minutes, creating a pustular eruption; especially the juice of the root, or the recent root, bruised

and applied. The root is from one-third of an inch to an inch or two in diameter, and one or two feet long, and should be gathered in the fall; it is inodorous and almost tasteless, causing a sense of heat shortly after having been chewed. The bark of the root is the officinal part, which is quite thick, constituting nearly two-thirds of the whole root; its virtues are imparted to water or alcohol, and remain in the extract formed by the evaporation of either solvent. It forms a light brownish-yellow powder, speckled throughout with innumerable fine dark spots, somewhat resembling a mixture of fine pepper and salt, with the exception of color. Dr. Zollickoffer found it to contain resin, mucilage, and caoutchouc. Kino and Catechu are *incompatible* with this plant; when united with either, the medicinal powers of the euphorbia are destroyed, while the astringency of the Kino or Catechu becomes entirely altered. Probably all vegetable astringents are incompatible with the agent under consideration. Opium interferes with its emetic operation, and should not, therefore, be given in combination with it, when emesis is desired. Acetic acid also interrupts its emetic influence, causing it to pass off by the bowels.

Properties and Uses.—Emetic, diaphoretic, expectorant, and epispaetic. Fifteen or twenty grains of the powdered bark of the root will excite emesis, rarely occasioning pain or spasms, and giving rise to very little previous nausea or giddiness; when it does not prove emetic, it passes off by the bowels. Four grains of the powdered root-bark, given every three hours, will act as a diaphoretic; or the compound powder of ipecacuanha and opium may be employed for the same purpose, substituting the *E. corollata* for the ipecacuanha. In doses of three grains, exhibited occasionally in a little honey, syrup or molasses, it operates as a useful expectorant, and may be administered in all cases where such action is desired. When given in large doses, it is apt to induce inflammation of the mucous coat of the stomach and bowels, with hypercatharsis. Occasionally, when given as an emetic or cathartic, it causes distressing nausea, with considerable prostration. From four to ten or twelve grains generally act as a cathartic. In dropsical diseases, especially hydrothorax and ascites, it will evacuate the water when all other agents prove useless, for which purpose it may be given in doses of fifteen or thirty grains, and repeated twice or three times weekly.

EUPHORBIA HYPERICIFOLIA.

Large Spotted Spurge.

Nat. Ord.—Euphorbiaceæ.—*Sex. Syst.*—Dodecandria Trigynia, *Linnaeus*; Monœcia Monadelphica, *Michaux*.

THE LEAVES.

Description.—This plant, also known by the names of *Black-purse-ly*, *Milk-pursely*, *Eye-bright*, etc., is an annual plant, with a smooth,

somewhat procumbent, branching *stem*, from one to two feet high; the *branches* are dichotomous, and divaricate-spreading. The *leaves* are from half an inch to an inch in length, and about one-fourth as wide, opposite, oblong, somewhat falciform, serrated, oblique or heart-shaped at base, often curved, three to five-ribbed underneath, on very short petioles, and often marked with purple oblong dots and blotches. The *flowers* are small, white, numerous, and disposed in terminal and axillary corymbs. *Fruit* mostly rather hairy; *seeds* four angled, obscurely wrinkled transversely.

History.—*E. Hypericifolia* is an indigenous plant, growing in rich soil in waste and cultivated places, and flowering from July to September. The leaves are the parts used, and yield their properties to water or alcohol; they have a sweetish taste, succeeded by a sensation of harshness and roughness. They contain caoutchouc, resin, tannin, gallic acid, etc.

Properties and Uses.—Astringent, tonic, and slightly narcotic. As an astringent it has been found efficacious in dysentery, after having previously removed the inflammatory symptoms, often curing the disease in forty-eight hours; also in diarrhea, after the exhibition of some purgative; in menorrhagia from debility; also in leucorrhea, and other affections where this class of agents is indicated. Half an ounce of the dried leaves may be infused in a pint of boiling water for half an hour. In dysentery and diarrhea, a tablespoonful may be given every hour until the discharges become less frequent, and other morbid symptoms begin to yield; then to be used less frequently. In the other diseases a wineglassful may be given three times a day.

The *Euphorbia Maculata*, or Spotted Spurge, is possessed of similar properties, and has been used with advantage in the same forms of disease, as cholera-morbus, diarrhea, dysentery, etc. It is an annual plant, generally found growing with the *E. Hypericifolia*, and possesses sensible properties analogous to those of this variety. It has a procumbent *stem*, spreading flat on the ground, much branched and hairy; the *leaves* are opposite, oval or oblong, minutely serrulate toward the end, unequal at the base, slightly three-ribbed, smooth above, hairy and pale beneath, oblique at the base, on short petioles, often spotted with dark purple, from three to six lines long, and one-half as wide. The *flowers* are white, solitary, axillary, much shorter than the leaves, appearing from July to October; female flowers naked. *Filaments* articulated; *receptacle* squamose; *capsule* three-grained, smooth, pubescent, or warty; *seeds* four-angled, obscurely wrinkled transversely, and about one-third smaller than the *E. Hypericifolia*.

EUPHORBIA IPECACUANHA.

American Ipecacuanha.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Dodecandria Trigynia, *Linneus*; Monœcia Monadelphia, *Michaux*.

THE BARK OF THE ROOT.

Description.—This plant, also known by the names of *Wild Ipecac.*, *Ipecac Spurge*, *Spurge*, has a perennial, yellowish, irregular, succulent, and very long root, sometimes extending to a depth of six or seven feet, its thickest part being, when full-grown, from three-quarters of an inch to an inch and a half in diameter. The stems are numerous, herbaceous, erect or procumbent, rather thick and succulent, smooth, dichotomous, jointed at the forks, white under the ground, red, pale-green, or yellow above, sometimes almost buried in the sand, forming thick, low bunches upon its surface. The leaves are from an inch and a half to two inches long, and from three to six lines wide, inserted at the joints, opposite, sessile, entire, smooth, usually oval, but occasionally round, obovate, lanceolate, or linear, and varying in color from green to crimson; they also vary considerably in size. *Stipules* small, cordate. The flowers are small, solitary, on long, axillary peduncles. The calyx is spreading, with five exterior obtuse segments, with five small, gibbous, inner segments or nectaries. *Stamens* numerous, in five parcels, appearing at different times two or three together, with double anthers. The fertile flowers have a large, roundish, drooping, pedicelled germ, crowned with six revolute stigmas. The capsule is three-celled and contains three seeds.

History.—This is an indigenous plant, found growing in dry, sandy soil, on Long Island, in New Jersey, and the Middle and Southern States, and flowering from May to August. As with the *E. Corollata*, it yields a milky juice, which causes a pustular eruption when applied to the skin. The root is the part used in medicine; in the dried state it is light and brittle, of a grayish color externally, white within, inodorous, and of a sweetish not unpleasant taste. The powdered root is of a light-brown, or light snuff-color, speckled similar to the *E. Corollata*. Water or alcohol takes up its active properties. It has not been accurately analyzed, but is supposed to contain caoutchouc, resin, gum, and perhaps starch. Its *incompatibles* are probably the same as those of the *E. Corollata*.

Properties and Uses.—It very much resembles the *E. Corollata* in its actions upon the system, but is rather milder. It is emetic, diaphoretic, expectorant, and epispastic; and may be used in the same doses and for the same purposes as the *Corollata*; in dropsical affections it is preferred by some practitioners. When given in cathartic doses, say from three to ten grains, it is said to promote the menstrual discharge. As an

emetic and cathartic it has been found valuable in bilious colic, but is superseded in this disease by the *Dioscorea Villosa*, which acts promptly and efficiently without any unpleasant symptoms. In dyspepsia one or two grains, repeated three times daily, will be found useful. The dose of the powdered root is from ten to fifteen grains as a hydragogue; one to three grains as an expectorant and diaphoretic. It is occasionally used in jaundice and obstinate torpidity of the liver. It is principally used by Eclectics as a hydragogue in dropsical affections.

EUPHORBIIUM.

Euphorbium.

Nat. Ord. — Euphorbiaceæ. *Sex. Syst.* — Dodecandria Trigynia, *Linnaeus*; Monœcia Monadelphia, *Michaux.*

THE CONCRETE RESINOUS JUICE OF AN UNDETERMINED SPECIES OF EUPHORBIA.

History.—The precise source from which this resin is obtained is unknown. It is found in commerce in the shape of tears, or in oblong or roundish masses, about the size of a pea or larger, often forked, and perforated with one or two small conical holes, produced by the prickles of the plant, around which the juice has concreted, and which sometimes remains in the holes. The masses are occasionally large and mixed with impurities. The surface is dull and smooth, bearing some resemblance to that of tragacanth; the consistence somewhat friable; the color light-yellowish or reddish; the odor scarcely perceptible, a slight taste at first, followed by excessive acidity and burning. The powder is yellowish. Alcohol dissolves the resin on which its activity depends. Triturated with water it forms a milky liquid, and is partially dissolved. It contains a large proportion of resin, excessively acid, soluble in alcohol, fusible, and burning with a brilliant flame, diffusing an agreeable fragrance; also wax, malate of lime, malate of potassa, lignin, bassorin, volatile oil, water, and caoutchouc.

Properties and Uses.—Emetic, cathartic, and errhine. Seldom, however, used for these properties, on account of its severity of action. Its principal use is externally as a rubefacient or vesicant; the following preparation forms an excellent counter-irritant: Take of powdered Euphorbium half a drachm, coarsely powdered Cantharides, and Meze-reon bark, of each two drachms, rectified spirits of wine two and a half fluidounces. Mix together, digest for eight days, then press and filter, and to the filtered tincture add, white colophony one ounce, white turpentine six drachms. With this preparation, paper or silk may be coated three several times, by means of a soft sponge, and which, when dry, forms an excellent irritating plaster in rheumatic, gouty and neuralgic pains.

EUPHRASIA OFFICINALIS.

Eyebright.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Didynamia Angiospermia.

THE LEAVES.

Description.—This is an elegant, little, annual plant, with a square, downy, leafy stem, simple or branched, and from one to five inches in height. The leaves are almost entirely opposite, ovate or cordate, downy, strongly ribbed and furrowed, the lowest crenate, the floral with sharp, tooth-like serratures. The flowers are axillary, solitary, very abundant, inodorous, with a brilliant variety of colors. The corolla varies much in size as well as in color, being commonly white, with deep purple streaks, and a yellowish palate. Upper lip of the corolla galeate, emarginate, two broad and spreading lobes; lower lip larger, spreading, three-cleft, the lobes obtuse or notched. Calyx campanulate, four-cleft. Stamens four, fertile, under the upper lip; anthers violet, lower cells of the upper ones with a long spur. Pod oblong, flattened; seeds numerous, oblong, grooved lengthwise.

History.—This is a small plant, common to Europe and this country, bearing white or red flowers in July. The leaves are commonly employed, they are inodorous, but of a bitter, astringent taste. Water extracts their virtues.

Properties and Uses.—Slightly tonic and astringent. Used with much benefit in the form of infusion or poultice, in catarrhal ophthalmia; also of service in all mucous diseases attended with increased discharges; and in cough, hoarseness, earache, and headache, which have supervened in catarrhal affections.

FEL BOVINUM.

OX, OR BEEF'S GALL.

Preparation.—As prepared for medicinal purposes, it is dried by spontaneous evaporation, or aided by a very moderate heat, when it becomes of a more or less solid and hard consistence, brown color, and possessing its natural and peculiar odor. The method recommended for its preparation is to pour two or three gallons of the gall into a deep vessel, and let it stand for twenty-four hours. Then pour off the supernatant fluid into a shallow earthen dish. Simmer it away slowly, stirring it all the time until it is dry. Then preserve in glass bottles well stopped. Thus prepared it is of a bright-green color, friable, pulverulent, and slightly aromatic.

A refined gall is obtained by boiling one pint of it and skimming; then add alum one ounce, and keep it on the fire for some time; to another pint of gall add one ounce of common salt, in the same manner;

keep them bottled, separately, for three months, then decant off the clear liquid; mix them in equal proportions; a thick, yellow coagulum is immediately formed, leaving the refined gall, clear and colorless.

History.—The bile of the ox is a viscid fluid, of a green, or greenish-yellow color, with a peculiar, nauseous odor, and a bitter taste; its exact composition is not yet settled. According to a recent analysis by A. Strecker, the bile of the ox consists of a mixture of a nitrogenous acid free from sulphur, which he calls *Cholic acid*, and a sulphureted acid free from nitrogen; both of these acids are combined with soda. The sulphureted constituent undergoes decomposition with great facility, yielding a resin, taurin, and ammonia; so that it is obtained separate with considerable difficulty. Probably, the picromel, biliary sugar, and bilin of other chemists may be referred to this constituent. In addition to the above, bile also contains a coloring matter, called *Cholepyrrhin*, a peculiar fatty principle, called Cholesterin, oleate, margarate and stearate of soda, with various salts of soda, and phosphate of lime.

Properties and Uses.—Tonic, and laxative. Used in intermittents, dyspepsia, torpor of the liver, colic, constipation, diarrhea, dysentery, etc. Five or eight grains of inspissated gall neutralize the constipating and narcotic effects of one grain of opium, without injuring its sedative influence. Dose, from one to ten grains.

FERRUM.

Iron.

History.—There is no metal of more utility to mankind, whether civilized or not, or more abundantly diffused throughout nature than iron; independently of its existence in the form of ores, it is found to a greater or less extent as a constituent of earths, minerals, vegetables and animals. It is found in meteoric stones, frequently in its pure state; and forms an essential constituent of the blood, in man, and many animals; and is one of those metals which, under certain circumstances, may be employed medicinally, with safety and advantage to the human constitution.

Iron occurs in its native state, and in combination with other substances forming what are called iron-ores. Its most common ores are the sulphuret of iron, or magnetic and cubic iron pyrites; magnetic, red, brown, specular, and argillaceous oxides of iron; and the carbonate, sulphate, phosphate, and arseniate of iron. Magnetic, and specular iron ores furnish the best iron, and these are found in abundance in Sweden, Spain, France and Germany, likewise furnish the carbonate or sparry iron, red, brown, specular, and argillaceous oxides. In the United States iron is found in large quantity, but is principally in the form of brown, magnetic, or argillaceous oxides; and some of the ores, espe-

cially those of New York, New Jersey, and Pennsylvania, are equal if not superior to the first quality of Swedish ore.

As the character of the ores differs, the method of extracting the iron from them consequently varies. As a general rule, the ore is broken into small pieces and roasted; it is then exposed to the influence of an intense heat, in contact with lime, anthracite coal, charcoal, or coke, and in connection with some flux capable of fusing with the impurities of the ore, such as limestone when the ore is argillaceous, and clay when it is calcareous. The flux by fusion with the impurities forms what is called the slag, while the carbonaceous matter reduces the oxide of iron to the metallic state. The slag which occupies the upper strata of the fused mass, is allowed to escape through a hole in the side of the furnace, after which the melted metal is run off, through an opening in the bottom of the furnace, into long, triangular molds, forming, when cold, the *pig* or *cast iron* of commerce. This, however, still contains many impurities, as carbon, phosphorus, sulphur, silicon, and occasionally manganese. To remove these impurities, the iron is again melted, and exposed, while stirring it, to a current of air playing on its surface, by which means the carbon is nearly burned out, and the other impurities becoming oxidized, rise to the surface as a slag. As the metal purifies, notwithstanding the same degree of heat is maintained, it becomes less liquid and tough, its particles adhering to each other, forming half fused lumps, which are removed from the furnace, and by means of ponderous hammers, moved by steam or water-power, are beaten into tenacious masses, which are finally rolled into bars of proper size, forming the *soft* or *malleable iron* of commerce.

Iron has a bluish-gray, or grayish-white color, a granular or irregularly foliaceous fracture, with considerable brilliancy, which is rapidly lost under exposure to both moisture and air combined. It has a peculiar, slightly styptic taste, and a peculiar odor rendered more sensible by friction. It varies in density from 7.6 to 7.84, and is fused only at a very high temperature. It is hard, very ductile, considerably malleable, and the most tenacious of metals. It possesses magnetic, as well as welding properties. In oxygen gas it burns with brilliant scintillations, and when heated to whiteness it likewise burns in atmospheric air, on being struck in particles from the mass. Exposed to the combined action of air and moisture, it becomes covered with a reddish hydrated sesquioxide, called *Rust*. It unites with oxygen, forming three oxides, a protoxide, a sesquioxide, and a compound of these forming the native black oxide, and a teroxide, having acid properties, called Ferric acid. It unites readily with sulphur, with iodine if moisture be present, with most of the metals, and with all the non-metallic elements, except hydrogen and nitrogen. It forms salts with the acids, which are generally soluble and crystallizable.

The *protoxide of iron* is of a dark-blue color, attracted by the magnet, and spontaneously combustible in the air, being converted into the sesquioxide. It is the base of sulphate of iron, and of the green salts of iron, generally. From its tendency to absorb oxygen, its salts when in solution become changed into salts of the sesquioxide. It consists of one equivalent of iron 28, and one of oxygen 8=36.

The *sesquioxide of iron*, may be obtained by dissolving iron in nitromuriatic acid, precipitating by ammonia, and igniting the precipitate. It is of a reddish color, forming salts usually of a similar color, and is not attracted by the magnet. It is composed of two equivalents of iron 56, and three of oxygen 24=80. One equivalent of the sesquioxide 80, with one of the protoxide, 36, forms the native black, or magnetic oxide, =116. The teroxide or ferric acid consists of one equivalent of iron 28, and three of oxygen 24=52.

Iron may be detected even in minute quantities by bringing it to the state of sesquioxide in solution, and adding ferrocyanuret of potassium which will strike a deep blue with it, or tincture of galls, which turns the solution black. It may be converted into a sesquioxide by boiling the solution holding it with a little nitric acid.

Properties and Uses.—Iron in its metallic form has no action on the system; when swallowed in this state it becomes oxidated, apparently at the expense of the water in the stomach, for eructations take place, having a disagreeable chalybeate taste, and an odor of hydrogen. It is usually given in the form of iron filings, in doses of from five to ten grains. The proper method of obtaining iron filings for medical purposes, is to file a piece of pure iron with a clean file; those obtained from the blacksmith's workshop, whether cleansed by the magnet or not, are impure and not fit for internal administration. Iron wire is generally sufficiently pure for the preparation of filings.

The various preparations of iron are powerfully tonic, and when taken for some time in small doses, they have the property of strengthening and sometimes accelerating the pulse, improving digestion, promoting the secretions, and increasing the coloring matter of the blood; when administered internally, iron probably enters the blood, as it has been detected in the urine. Whether it increases the iron of the blood, is still an unsettled question, although it renders that fluid more florid. The preparations of iron are contra-indicated in all inflammatory diseases, in persons subject to determinations of blood to the head, or affected with habitual constipation; when pushed too far, or when injudiciously prescribed, it causes a sense of fullness in the head, headache, giddiness, heat, thirst, difficult breathing, distension of the limbs, and other symptoms of an excited circulation. They are useful in diseases characterized by debility and relaxation of fiber, and a languid circulation, more especially when the consequence of inordinate discharges.

The diseases in which they are most usually employed are chlorosis, hysteria, fluor-albus, gleet, scrofula, rickets, chorea, and all passive hemorrhages. Chalybeates are also proper in palsy after the inflammatory excitement has subsided, in dyspepsia dependent upon deficient energy of the digestive functions, and in neuralgia, when owing to a similar cause. They have also been found advantageous in ague, epilepsy, enlargement of the liver and spleen, and in chronic dysentery. The medical effects of iron, in its different combinations are nearly the same, but where it becomes modified or improved by combination, it will be noticed under the head of each preparation. When iron is in the form of protoxide it is generally more active than where it is present as a sesquioxide.

Off. Prep.—Ferri Acetas; Ferri Carbonas Saccharatum; Ferri Citras; Ferri et Quiniæ Citras; Ferri et Morphię Tartras; Ferri et Quiniæ Tartras; Ferri et Salicinïæ Tartras; Ferri Ferrocyanuretum; Ferri Iodidum; Ferri Lactas; Ferri Nitras; Ferri Oxidum Hydratum; Ferri Oxidum Rubrum; Ferri Phosphas; Ferri Pulvis; Ferri Subcarbonas; Ferri Sulphas; Ferri Sulphas Exsiccatum; Ferri Tannas; Ferri Valerianas.

FICUS CARICA.

Fig.

Nat. Ord.—Urticacæ; Moracæ, *Lindley*. *Sex. Syst.*—Polygamia Diœcia.

THE DRIED FRUIT.

Description.—The fig-tree is usually about ten or twelve feet in height, but in warm climates rises to twenty-five and even thirty feet. Its *trunk* seldom exceeds seven inches in diameter, and is divided into numerous round spreading *branches*, covered with a coarse short down, and a brown or ash-colored bark. The *leaves* are large, palmate, three to five-lobed, or almost entire, lobes obtuse, coarsely serrated, deep green, shining, and rough upon their upper surface, pale green and coarsely downy beneath, and stand alternately on strong round petioles. The *flowers* are green, and situated within a turbinate, fleshy, closed receptacle, which is placed solitarily upon a short peduncle in the axils of the upper leaves. Male flowers, calyx three-parted; female flowers, calyx five-parted. *Stamens* three; *pistil* one, lateral. The *receptacle* forms what is called the *fruit*, it is more or less pearshaped, or almost round, succulent, sweet and pleasant to the taste. The numerous seeds which are attached to the internal surface of the receptacle, by fleshy pedicels, constitute more properly, the fruit.

History.—The fig-tree is supposed to have come originally from the Levant, but is now cultivated in all temperate climates. The structure of its fruit is peculiar; at first it is nothing more than a fleshy receptacle; but, as it advances to maturity, minute flowers form in a cavity,

which occupies the center of the mass and communicates outwardly by a small round aperture at the summit, and these flowers are succeeded by many small roundish seeds. While young, the fig abounds, like the trunk and branches, with a milky, aromatic, acrid juice, destitute of sweetness; but as it matures, sugar and mucilage are formed, and the acridity disappears. It is usually top-shaped, umbilicate at the large extremity, about the size of a small pear, of a whitish, yellowish, or reddish color, and when ripe, is sweet, high-flavored, and wholesome; but if eaten to excess, occasions flatulence, pain in the bowels and diarrhea. When perfectly ripe, it is dried by the heat of the sun, or in ovens. Those figs which are brought to the United States, come chiefly from Smyrna, packed in drums or boxes. They are more or less compressed, and, in cold weather, are usually covered with a whitish, saccharine efflorescence, which melts in the middle of summer, and renders them moist. The best are yellowish or brownish, somewhat translucent when held to the light, and filled with a sweet viscid pulp, in which are lodged numerous small yellow seeds. Their chief constituents are sugar and mucilage.

Properties and Uses.—Nutritious, laxative, and demulcent. Used in some cases of constipation, as a laxative article of diet. Occasionally they enter into demulcent decoctions; and when roasted or boiled and split open, may be applied as a suppurative cataplasm to boils, buboes, carbuncles, and to parts upon which an ordinary poultice can not be conveniently retained.

FIRING.

Obtain a thick iron-wire shank, about two inches long, and inserted into a small wooden handle; on its extremity, which must be slightly curved, have a disk or button of iron, exactly one-quarter of an inch thick, and half an inch in diameter. The whole instrument to be only six inches in length. The face of the disk for application must be flat.

Mode of Application.—Light a small spirit lamp, and hold the button over the flame, keeping the fore-finger of the hand holding the instrument, at the distance of about half an inch from the button. As soon as the finger feels uncomfortably hot, the instrument is ready for use, and the time required for heating it to this degree, will be about half a minute. It is to be applied as quickly as possible to the parts, the skin being tipped successively, at intervals of half an inch, over the affected part, as lightly and as rapidly as possible, always taking care to bring the flat surface of the disk fairly in contact with the skin. In this way the process of firing a whole limb, or the loins, making about one hundred applications, does not occupy a minute, and the one heating by the lamp suffices. To ascertain whether the heat be sufficient, look sidewise at the spots as you touch them, and each spot will be observed to become

of a glistening white, much whiter than the surrounding skin. In from five to thirty minutes the skin becomes bright red, and a glow of heat is felt over the part. The iron must never be made red-hot—it is very little hotter than boiling water—should never make an eschar, and rarely raise a blister. On the next day after its application, a number of circular red marks will be seen on the skin, the cuticle not even being raised, and the surface ready, if necessary, for a fresh application. There is no discharge whatever, and in most cases the patient is unconscious of what has been done. It is vastly superior to a blister in many cases; even the most delicate female will not object to its frequent repetition when required.

Properties and Uses.—A powerful counter-irritant. Recommended by Dr. Corrigan in paralysis, local muscular rheumatism, sciatica, lumbago, neuralgic pains, etc., and wherever a counter-irritant is required. Also applied each side of the spinal column, in intermittents, epilepsy, mania and other diseases.

FENICULUM VULGARE.

Fennel.

Nat. Ord.—Apiaceæ, or Umbelliferae. *Sex. Syst.*—Pentandria Digynia.

THE SEED.

Description.—Feniculum Vulgare, or *Common Fennel*, has a biennial or perennial tapering root, and an annual, erect, solid, round, striated, smooth, leafy, copiously branched *stem*, growing from three to five feet in height. The *leaves* are alternate at the joints of the stem, upon broad membranous striated sheaths, and are triply pinnate; the *leaflets* are long, linear, acute, smooth, more or less drooping, deep green. The *flowers* are in large, flat, terminal umbels, with from thirteen to twenty rays; the partial rays more slender, short, and very unequal. *Bracts* or *involucres* wanting. The *corolla* consists of five petals, of a golden yellow color, which are obovate, with a broad, obtuse, inflexed point. *Calyx* none. *Styles* very short, with a large, ovate, pale-yellow base. *Fruit* ovate, not quite two lines long, and about a line in breadth, pale bright brown, smooth; *ridges* sharp, with but little space between each, the lateral ones rather the broadest; terminated by a permanent conical disk. Fennel is a native of Europe, growing wild upon sandy and chalky ground, and flowering in July.

FENICULUM OFFICINALE, or *Sweet Fennel*, has a perennial, fusiform and whitish root, with a solid, jointed, striated, shining, deep-glaucous-green *stem*. The *leaves* are shorter, and the *leaflets* less elongated than in the preceding species; the *fruit* is likewise twice as long, a little curved, and of a less dark color, with prominent ridges, and a persistent

peduncle. It is a native of the South of Europe, but is naturalized in this country, and is sweeter and more aromatic than *F. Vulgare*.

FÆNICULUM DULCE, or *Sweet Fennel*, and sometimes confounded with the *F. Officinale*, very much resembles the *F. Vulgare*, but differs in being a much smaller plant, only about a foot high,—in having its stem somewhat compressed at the base—its radical leaves somewhat distichous, and in having only six or eight rays, instead of thirteen or twenty, as in the common fennel. The fruit likewise varies considerably, being narrow, oblong, three lines long, pale-dull-brown, smooth; ridges sharpish, with a space between each for a convex line indicating the vittæ, the lateral ones rather the broadest. This is also a native of southern Europe, and is cultivated largely in Italy and Sicily, for the sake of the shoots, which are eaten raw, or boiled as pot-herbs.

These plants were formerly included in the genus *Anethum* of Linnæus, but were separated from it by Gærtner and De Candolle, on account of the difference of the seed. Authors have not settled the question as to the officinal species, the botanical history of which is still a matter of confusion and indefiniteness.

History.—The seeds or half fruits of these varieties, do not differ materially in aromatic properties; they have a fragrant odor, and a warm, sweet, aromatic taste. There are three kinds in commerce; 1st, ovoid, glabrous, of a dull green, marked with lines, of which two are more prominent than the others—these are the product of *F. Vulgare*. 2d. Long, somewhat curved, of a brighter green, pedicel often adhering to them, and very aromatic, the product of *F. Officinale*. 3d. Much broader and ovoid, ribs strongly marked, from the *F. Dulce*. They impart their virtues to hot water, but more abundantly to alcohol. They contain volatile oil, which may be obtained by distillation with water, and likewise a large proportion of fixed oil.

Properties and Uses.—Carminative and stimulant. Used in flatulent colic, and as a corrigent of other less pleasant medicines. Dose of powdered seeds, from ten to thirty grains.

Off. Prep.—Aqua Fœniculi.

FRAGARIA VESCA.

Strawberry.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Polygynia.

THE FRUIT.

Description.—Strawberry has a creeping, knotty, perennial root, with short, upright and reclined, and procumbent and stoloniferous stems; stolons often creeping several feet. The leaves are pubescent, cauline and radical; the latter on long petioles, trifoliate, the leaflets sessile or nearly so, oboval, oval, or nearly round, deeply serrated; the former

nearly similar, but smaller, both with lanceolate, oblong, acute stipules. The *flowers* white, one or many, with erect or drooping pedicels. *Calyx* spreading or reflexed, divided into ten acute segments, the alternate one being somewhat shorter. The *petals* are five, white, oboval or obcordate, inserted on the calyx. *Stamens* indefinite, small, and also inserted on the calyx. *Ovaries* many, with a small stigma each, inserted on a succulent gynophore, which increases in size, becomes colored, and forms the fruit. In this species the *achenia* are superficial on the conical or hemispherical fruiting receptacle, not sunk in pits; in the *F. Virginiana* the *achenia* are imbedded in the deep pits of the receptacle.

History.—This is a European species, presenting innumerable varieties, which are cultivated in gardens, flowering from April to May, and ripening its fruit in May and June. The *F. Virginiana*, or wild strawberry, *F. Canadensis*, or mountain strawberry, *F. Grandiflora*, or pineapple strawberry, and the other varieties possess similar properties. The fruit of all the varieties, is highly fragrant and delicious when ripened in the sun; and the cultivated varieties frequently become very large, weighing an ounce or more. Strawberry consists of equal parts of citric and malic acids, sugar, mucilage, pectin, water, peculiar volatile aroma, woody fiber, and pericarps.

Properties and Uses.—The fruit has been highly spoken of in calculous disorders, used very freely, likewise in gout, and the juice will dissolve the hard concretions called “tartar,” which form on the teeth, and without injuring them. In some persons strawberries induce an eruption resembling nettle-rash, with a derangement of the digestive organs. The grains or seed-like pericarps are indigestible, and sometimes cause irritation of the bowels. Strawberry juice, or the syrup, added to water, forms a refreshing and useful drink for febrile patients; care being taken that the grains are removed by filtering or expressing the juice or syrup through a piece of muslin. Strawberries eaten with cream are injurious to dyspeptics. The leaves are somewhat astringent, and have been used in infusion, in diarrhea, dysentery, and intestinal debility; the roots are diuretic, and have been beneficially used in infusion in dysuria, gonorrhea, etc.

FRASERA CAROLINENSIS. (*Frasera Walteri*.)

American Columbo.

Nat. Ord.—Gentianaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE ROOT.

Description.—American Columbo is an indigenous plant, with a triennial, long, spindle-shaped, horizontal, fleshy, rugose, and yellow root, and a smooth, erect, solid, cylindrical, or subquadrangular, succulent dark-purple *stem*, from four to nine feet in height, one or two inches in

diameter at base, and branched above. The leaves are opposite, sessile, entire, glabrous, deep-green, subcarnose, from three to twelve inches long, by one to three inches wide, and in whorls of from four to six. The whorls commence at the root, and ascend to the top with successively diminishing intervals and leaves. The lower or radical leaves are from five to twelve in number, elliptical, obtuse, very long, and rest upon the ground in the form of a star. The cauline leaves become successively smaller as they ascend, the lowest oblong lanceolate, the upper lanceolate and pointed. The *flowers* are yellowish-white, or greenish-yellow, numerous, forming a large terminal, compound, pyramidal, leafy, verticillate panicle, from one to five feet long, the branches of which spring from the axils of the upper leaves; *peduncles* one-flowered, unequal, leafy, or bracteate. *Calyx* deeply four-cleft, spreading; *segments* lanceolate, acute, persistent, and nearly as long as the corolla. *Corolla* with four elliptic segments, flat and spreading; margin somewhat inflexed, an oval or orbicular fimbriated, purple pit or gland in the center of each. *Stamens* four, alternate with the segments, and shorter than the corolla. *Filaments* subulate, short, and inserted into the base of the corolla between its segments; *anthers* large, oval, oblong, yellow, and notched at the base. *Ovary* oblong-ovate, compressed, bearing a short style with a bifid stigma. *Capsule* or *fruit* yellowish, oval, acuminate, with the persistent style, compressed; margin thin, two-valved, one-seeded. *Seeds* eight to twelve, flat, elliptical, imbricated, winged.

History.—This plant grows west of the Alleghanies, and from New York to Alabama, in rich woody lands and meadows, and bearing flowers in June and July. The stems and flowers are produced in the third year, previous to which the radical leaves only appear above ground. The root is the officinal part, and should be collected in the autumn of the second, or the spring of the third year; they are large, yellow, rugose, hard, and spindle-shaped; but as found in the shops, they are in dried, transverse slices, having a light reddish-brown epidermis, a thick yellow bark, and a yellowish spongy medullium. The taste is bitter and slightly sweetish without aroma. Water or diluted alcohol extracts its virtues, and on adding water to the tincture, a precipitate is thrown down, but it is not disturbed by the tincture of galls. It contains bitter extractive, gum, tannin, gallic acid, resin, a fatty matter, sugar, etc.

It may be distinguished from Colombo, by the greater uniformity of its internal structure, the absence of concentric and radiating lines, their purer yellow color without a greenish tinge, and by affording a dark-green precipitate with the salts of iron, which is not the case with Colombo; and this last, in tincture, gives a dirty-gray precipitate with tincture of galls.

Properties and Uses.—The fresh root is emetic and cathartic; the dried, a simple tonic, which may be used wherever mild tonics are indi-

KE.

SCOUT COLLECTORS.

Nutshells and Fruitstones Wanted by the Ton.

There are some things that are "vital for the safety of our soldiers at the front." These things are easily obtainable by everybody, if in small quantities only, and a "mickle" soon makes a "muckle" if the workers be many. The Chief Scout, Sir Robert Baden-Powell, is appealing to Boy Scouts to begin the collection of nut shells and fruit stones under the arresting words quoted above. It might be profitable to approach nut merchants for shells, as most of the walnuts and almonds now on sale are already shelled. Therefore, boys, get at the wholesale people! Also, if every Scout saves the stones of whatever stone-fruit he may be fortunate enough to get hold of, and if every Scout in the land does his best, why, we should soon have a pyramid of the much wanted article! So be on the look out, you boys of all classes. Store up the stones and take them to your headquarters. Scoutmasters will be able to send them on to the proper centres.

The Chief Scout's Summary.

For six pre-war years Boy Scouts raised a little mild amusement in the minds of their elders, but in August, 1914, with such preliminary training as they had managed to acquire, they suddenly burst into a blaze of national usefulness. Reiteration is unnecessary, but in one town alone some 700 were called out for duty, which the majority of them have been doing for four years, unflinchingly and untiringly. The same may be said for varying numbers in most other centres, and also for other admirable youthful organisations. I do not think the Chief Scout will object if I quote in its entirety his splendid "Summary of what Scouts are doing to help their country," to be found in this month's "Headquarters Gazette":

"At the present time in the Scout Movement we are helping the Army with our nine Air Schools and with the Scouts Defence Corps which give a practical training course for preparing boys for army service.

"We are also helping the Navy by carrying on the Coast-Watching Service under the Admiralty, and co-operating in

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the Auxiliary Fleet, as well as signallers in the Navy itself.

"Reports from both services show that our training gives the very best results.

"We are also planning to carry out a big extension for providing men for the mercantile marine after the war.

"We are co-operating with the Education Department in the matter of giving direct practical encouragement to the boys to take up continuation and technical school training.

"We are aiming, with the India Office, to bring about closer touch between the young Indian Boys and their British fellow-subjects, as we have already done in South Africa.

"We are organising closer touch with the boys of neutral and Allied countries, all of which have started branches of the Scout movement. This is being done under the encouragement of the Foreign Office.

"We are supplying Scouts for various kinds of duties during the war, such as assisting police, fire brigades, and acting as orderlies to staff officers, hospitals, soldiers' clubs, etc.

"And most especially, we are training the

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cated. Dose of the powder from twenty to sixty grains, of the infusion from one to four fluidounces, three or four times a day.

Off. Prep.—Infusum Fraseræ.

FRAXINUS SAMBUCIFOLIA.

Black Ash.

FRAXINUS ACUMINATA.

White Ash.

Nat. Ord.—Oleaceæ. *Sex. Syst.*—Dioecia Diandria.

THE BARK.

Description.—*Fraxinus Sambucifolia* is a tree which attains the height of from forty to seventy feet; the *trunk* is covered with a bark of a darker hue than that of the White Ash, and less deeply furrowed, and is from one to two feet in diameter. The wood is purplish, very tough and elastic, but less durable than the white ash. The *leaves* are from nine to sixteen inches in length, and are composed of about seven *leaflets*, which are sessile, ovate-lanceolate, serrate, rugose and shining, round-oblique at the base, smooth above, and red-downy on the veins beneath. *Calyx* and *corolla* both wanting; buds of a deep-blue color. *Samara* elliptical-oblong, very obtuse at both ends. This species grows in swamps and moist woods in the northern States and Canada, blossoming in May. The young saplings are much employed in making hoops, and the mature trunks for baskets. The leaves when bruised exhale the odor of Elder.

FRAXINUS ACUMINATA of Lamark, or the *Fraxinus Americana* of Linnaeus, is a large forest tree, which grows from fifty to eighty feet high; it often rises more than forty feet without a branch, and then expands into a regular summit of an equal additional height. The *trunk* is covered with a gray, furrowed and cracked bark, and the branchlets are a smooth greenish-gray. The *leaves* are a foot or more in length, opposite, pinnate, consisting of about seven *leaflets*, which are petiolate, oblong, shining, acuminate, entire or slightly toothed, glaucous beneath. Its *flowers* are whitish-green, and are disposed in loose panicles, the fertile ones with a calyx, and the barren ones without. *Corolla* wanting. *Calyx* small and four-cleft; buds of a rust-color. *Samara* spatulate-linear, obtuse, with a long narrowed base. The white ash is chiefly confined to the Northern States and Canada, growing in rich woods, and blooming in April and May. Its wood is light, firm, elastic and durable, furnishing a most excellent timber for carriage-frames, bars, handspikes, agricultural implements, etc.

History.—There are several species of this tree, all of which possess medicinal virtues, probably, of a similar character. The bark is the

part used, the properties of which are extracted by water. No analysis has been made of it.

Properties and Uses.—Tonic and astringent. An extract of the black ash used as a plaster is very valuable in salt rheum, and other cutaneous diseases. The infusion may be used internally as a tonic, and for all purposes where a combination of astringency with tonic influence is indicated.

The white ash is also cathartic, and has been found beneficial in some cases of constipation, and also in dropsical affections. It may be used in the form of infusion, or in bitters. The bark in white wine, is said to be efficient in curing ague-cake, or enlarged spleen. The seeds are said to prevent obesity.

The leaves of the common ash, *Fraxinus Polygamie*, have been highly recommended in the treatment of gout and rheumatism. No nausea, sickness, general discomfort, nor depression attends their employment, and generally, after having used them for four or five days, and sometimes sooner, the pain, redness, and swelling sensibly diminish in intensity, or entirely disappear. About two and a half ounces of the powdered leaves are to be infused for three hours in a sufficient quantity of boiling water, then strained through a linen cloth and sweetened; this is to be taken during the day, at several draughts, and is to be repeated daily; it should be continued for eight days after the symptoms have disappeared. In chronic gout it may be repeated for eight or ten days every month, for several consecutive months. Probably the leaves of the above species, or of the *Fraxinus Quadrangulata*, or *Blue Ash*, will be found equally efficacious.

FUCUS HELMINTHOCORTON.

Corsican Moss.

Nat. Ord.—Algaceæ, or Ceramiaceæ, (*Lindley*). *Sex. Syst.*—Cryptogamia Algæ.

THE WHOLE PLANT.

Description.—This is the *Gigartina Helminthocorton* of Greville; it has a cartilaginous, terete, tufted, entangled *frond*, with setaceous *branches*, somewhat dichotomous, marked indistinctly with transverse streaks. The lower part dirty-yellow, the branches more or less purple.

History.—This is a marine plant, growing on the Mediterranean coast, and especially on the Island of Corsica. The plant is of a cartilaginous consistence, of a dull and reddish-brown color, has a bitter, salt and nauseous taste, and its odor is rather pleasant. It is found in the form of thick tufts, composed of numerous filaments, united at the base, in bundles intermingled together, and fastened to each other by small hooks, with which the stems are furnished. It is seldom employed in this country. Water dissolves its active principles.

Properties and Uses.—Anthelmintic. The influence exercised by this substance upon the economy, is hardly appreciable; perhaps, occasionally, a slight irritation of the digestive canal—but it acts very powerfully on the intestinal worms, especially the lumbricoid. Dr. Johnson affirms that when thrown into the rectum, “it destroys any worms domiciliating there as effectually as choke-damps would destroy the life of a miner.” The dose is from ten to sixty grains, mixed with molasses, jelly, or syrup, or in infusion.

FUCUS VESICULOSIS is a perennial seaweed. The *root* is a hard flattish disk. *Fron*d from a few inches to four feet in length, and from two lines to an inch in width, flat, furnished with a midrib throughout its length, occasionally twisted in a spiral manner, repeatedly dichotomous, the angles of the dichotomy acute, except when a solitary vesicle happens to be placed there; the sterile branches obtuse and often notched at the extremity. Air vessels from the size of a pea to a hazelnut, in pairs, and situated at irregular intervals in different parts of the frond; sometimes two or three pairs are arranged next to each other; they are rarely altogether wanting. Receptacles terminal, compressed, mostly ovate or elliptical, about half an inch long, but varying from nearly spherical to linear-lanceolate, and from one-fourth of an inch to nearly two inches long; they are mostly in pairs, but are sometimes solitary, and occasionally forked. They are filled with a clear, tasteless mucus. The whole frond is proliferous in a remarkable degree in cases of injury, throwing out numerous new shoots from the injured part.

The FUCUS VESICULOSIS, *Sea Wrack*, or *Bladder Wrack*, grows upon the shores of Europe and of this continent, attaching itself to the rocks by its expanded woody root. On the coast of Scotland and of France, it is much used in the preparation of kelp. It is also employed as a manure, and is mixed with the fodder of cattle.

The Fucus Vesiculosus has a peculiar odor, and a nauseous saline taste. Several chemists have undertaken its analysis, but the results are by no means satisfactory. It contains a large quantity of soda in saline combination, and iodine, according to Gaultier de Claubry, in the state of iodide of potassium. These ingredients remain in its ashes, and in the charcoal resulting from its exposure to heat in close vessels. The charcoal of this plant has long had the reputation of a deobstruent, and been given in goitre and scrofulous swellings. Its virtues were formerly ascribed chiefly to the carbonate of soda, in which it abounds; but since the discovery of the medical properties of iodine, this has been considered as its most active ingredient. The mucus contained in the vesicles was applied externally, with advantage, by Dr. Russel, as a resolvent in scrofulous tumors.

Other species of Fucus are in all probability possessed of similar properties. Many of them contain a gelatinous matter, and a saccharine

principle analogous to mannite; and some are used as aliment, in times of scarcity, by the wretched inhabitants of the coasts where they are collected.—*U. S. Disp.*

FULIGO LIGNI. (*Fuligo Splendens.*)

WOOD-SOOT.

Description.—The best soot for medicinal purposes, is that which is gathered within an air-tight wood stove and its pipe; that which is collected from a clean chimney or ordinary stove-pipe, where hard wood alone is burned, will ordinarily answer, if it be free from ashes and lime. Soot has a peculiar smell, resembling that of creosote, and a bitter, empyreumatic, disagreeable taste. Powdered soot steeped in boiling water makes an infusion of a deep-yellow or brown color, imparting to it its characteristic odor and taste. The part which is soluble consists chiefly, according to Berzelius, of a pyrogenous resin united with acetic acid, saturated with potassa, lime and magnesia. It also contains sulphate of lime, chloride of potassium, acetate of ammonia, and traces of nitric acid. If the solution be evaporated to dryness, it furnishes a black extract, which on being redissolved in water forms a blackish-brown solution, which lets fall acid pyretin, in the form of a black mass resembling pitch, when treated with any free acid except acetic; the acid employed remains in solution with the bases previously in combination with the pyretin. That portion of soot which is insoluble in water, amounts to about forty-four per cent. In addition to the above ingredients, soot also contains empyreumatic oil, and creosote, to which it is supposed to owe its medical virtues, but which supposition is incorrect.

Properties and Uses.—Internally, soot will be found valuable in all forms of disease attended with acidity of the stomach. A powder composed of one part each of powdered rhubarb and soot, and half a part of bicarbonate of potassa, will be found invaluable in all such cases, removing acidity and a tendency to constipation; it may be given in doses varying from three to twelve grains, three times a day, or in sufficient quantity to cause one or two evacuations from the bowels daily. An infusion of soot, made so as not to be unpalatable, is very beneficial in inflammation of mucous membranes, and in hysteria. A strong decoction of soot used as an injection into the rectum, has caused the expulsion of ascarides; its use should be continued for several days in succession; injected into the bladder it has been of service in chronic inflammation of the bladder; it should be injected twice a day for some days. It possesses no antispasmodic virtues further than the neutralizing acidity of the stomach, to which the spasmodic action is owing. Combined with geraniin, in the proportion of two parts to one of the astringent, it will prove valuable in diarrhea and cholera-morbus of children; in summer-complaint, one part of leptandrin, and a fourth

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part of camphor or ginger may be added to the above. The infusion or decoction may be made by adding one or two ounces of soot to a pint of water, macerate or boil for half an hour, and filter; dose, one or two fluidounces, two or three times a day.

Externally, I have used the Unguentum Fuliginis, in cases of recent and extensive burns, with almost immediate relief; it must be spread on raw-cotton and applied over the part. The ointment is also efficacious in various cutaneous disorders, especially those of an erysipelatous character, tinea, fistula, cancerous and syphilitic ulcers, pruritus of the vulva, specks on the cornea, scrofulous ophthalmia, severe burns and scalds, etc. In some of these diseases the decoction will answer. In many ophthalmic diseases, a strong decoction of equal parts of soot and golden-seal, will be found valuable; it may also be employed internally by mouth, or injection into the bladder or vagina, for chronic mucous inflammation.

A preparation called *Fuligokali*, has been recommended in scrofula, chronic rheumatism, rheumatic tumors, and certain herpetic affections. It is made by boiling for an hour, one hundred parts of good, shining soot, and twenty parts of caustic potassa, each in powder, in two parts or a sufficient quantity of water. When cold the solution is diluted, filtered, and evaporated to dryness. *Fuligokali* is in the form of a black powder or scales, very soluble in water, of an empyreumatic odor, and mild alkaline taste. The dose is two or three grains, repeated several times a day. Sixteen or thirty-two grains to the ounce of lard, is said to form a deterative, resolvent, and gently stimulant ointment.

Off. Prep.—Unguentum Fuliginis.

Sa ph 317-18
World of Wonders

FUMARIA OFFICINALIS.

Fumitory.

Nat. Ord.—Fumariaceae. *Sex. Syst.*—Diadelphia Hexagynia.

THE LEAVES.

Description.—This is an annual glaucous plant, with a suberect, much-branched, spreading, leafy, and angular stem, growing from ten to fifteen inches high. The leaves are mostly alternate, bipinnate or tripinnate; leaflets wedge-shaped, cut into flat, lanceolate segments. The flowers are small, flesh-colored, tipped with crimson, nodding, the pedicels becoming erect in fruit. Racemes opposite to the leaves, stalked, erect, many-flowered, rather lax. Bracts lanceolate, acute, not half the length of the pedicels, especially when in fruit. Petals four, unequal, one of them with a short, rounded spur at the base. Calyx colored, toothed, deciduous. Fruit or nut ovoid or globose, indehiscent, emarginate, one-seeded, and valveless; seeds crestless.

Sa ph 1263
Wood Soot Salm.
For Swelling See No 919
Madagascar Medicine

Sa ph
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Medica
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913

Sulphate of
Ammonia
= Salt of
Sulphuric Acid

History.—This is a small European plant, naturalized in this country, growing in cultivated grounds, and bearing red flowers from May to August. The leaves are the officinal part; they are inodorous, have a bitter, saline taste, and are very succulent, yielding by expression a juice which has the sensible and medicinal properties of the plant. The whole plant abounds in saline substances. By evaporating the expressed juice, or a decoction of the leaves, an extract is obtained, which throws out upon its surface a copious saline efflorescence.

Properties and Uses.—Tonic, laxative, alterative, and diuretic. Esteemed as a valuable remedy in visceral obstructions, in scorbutic affections, in leprosy, and many forms of cutaneous disease. The expressed juice may be used in the dose of two ounces or more per day; or a decoction of the dried or fresh leaves and tops may be used freely. Two ounces of the flowers and tops infused in three pints of Madeira wine, and taken twice a day in doses of from two to four fluidounces, will strengthen the stomach and improve the appetite.

Off. Prep.—Infusum Fumariæ Vinum.

GALBANUM.

Galbanum.

THE CONCRETE JUICE OF AN UNKNOWN PLANT.

History.—The plant from which the gum-resin *Galbanum* is obtained, is unknown; various plants have at different times been supposed to afford it, but as there is no certainty in relation to the subject, it is scarcely necessary to refer to them. Galbanum is brought from the Levant, and from India. It is generally in masses of whitish, reddish, or yellowish tears, irregularly agglutinated by a darker colored yellowish-brown, or greenish substance, more or less translucent, of a peculiar, disagreeable odor, and a bitterish, warm, and acrid taste. Sometimes, though rarely, it has been obtained in the state of distinct roundish tears, about the size of a pea, of a yellowish-white or pale brownish-yellow color, shining externally, and translucent. In cool weather, galbanum has the consistence of wax; in summer it softens, and is rendered ductile and adhesive by the heat of the hand. As it is generally mixed with pieces of stalks, seeds, or other foreign matters, it should be melted and strained previous to using it. Its specific gravity is 1.212. It is soluble in diluted alcohol; when triturated with water, wine or vinegar, it forms an imperfect, not permanent, milky solution. Alcohol dissolves all except the gum. Diluted alcohol is its proper solvent. Ether dissolves the resin and volatile oil, leaving all the gum. It consists of resin, soluble gum, bassorin, volatile oil, traces of supermalate of lime, and some impurities. The volatile oil obtained by distillation with water,

is colorless, odoriferous, and becomes yellowish by age; it is lighter than water.

A dark-brown or blackish color, permanent softness, the absence of whitish grains, a deficiency in odor and taste, and a large amount of impurities in connection with the gum-resin, are signs of inferiority.

Properties and Uses.—Stimulant, expectorant, and antispasmodic. Used in chronic affections of the bronchial mucous membrane, amenorrhea, and chronic rheumatism. Externally, employed in the form of plaster to indolent tumors, and in tincture to scrofulous ophthalmia, and irritability or weakness of the eyes. Dose, from ten to twenty grains, in pill, or triturated with water, sugar, and gum arabic. It is less energetic than assafoetida, and seems to hold a middle place between this and ammoniac, so far so relates to activity.

GALIPEA OFFICINALIS.

Angustura.

Nat. Ord.—Rutaceæ. *Sex. Syst.*—Diandria Monogynia.

THE BARK.

Description.—This is a small tree not more than twelve to twenty feet in height, and about three to five inches in diameter, irregularly branched, and covered with a smooth, gray bark. The *leaves* are alternate, petiolate, and trifoliate; the *leaflets* are oblong, pointed at both extremities, supported on the common petiole by short footstalks, smooth, glossy, bright-green, smelling when fresh and bruised somewhat like tobacco; they are from six to ten inches long, and two to four inches wide, and some of them are marked with small, whitish round spots; *petioles* about the length of the leaflets, slightly channeled. The *flowers* are numerous, white, hairy, and arranged in terminal and axillary racemes, or with long peduncles; they likewise exhale an unpleasant odor. The *calyx* is somewhat campanulate, five-cleft, inferior, hairy; the *corolla* is about an inch long, downy on both sides, and somewhat curved before expansion. The *petals* are five, unequal, oblong, obtuse, and united at the base into a short tube. *Fertile stamens* two; *sterile ones* five, subulate, tipped with a pellucid watery gland. The *style* is erect with a simple stigma. The *fruit* consists of five bivalve capsules, of which two or three are commonly abortive; the *seeds* are two in each capsule, round, black, of the size of a pea, one of which is often abortive.

History.—There has been much confusion regarding the species from which the Angustura Bark is obtained, but the observations of Dr. Hancock have conclusively shown that the bark of commerce is derived from a tree to which he has given the above name. The tree grows abundantly on the mountains of Carony between the seventh and eighth

degrees of south latitude, and is well known in the district of country bordering on the Orinoco, at a distance of two hundred miles and upward from the ocean, and at an elevation of from six hundred to a thousand feet. The bark is generally brought from the West India ports, in casks. It is in flat pieces or incomplete quills, from two to eight inches long, half an inch to one and a half inches broad, and from half a line to three lines in thickness. Externally it is covered with a dirty grayish-yellow, wrinkled epidermis, easily removed by the finger nail, and internally, the substance of the bark is yellowish-brown. It breaks easily, with a short, resinous fracture, and affords a powder of a pale-yellow color, somewhat like that of rhubarb. When macerated in water, for a short time, it becomes soft and tenacious, and may be easily cut with scissors. It has a peculiar, disagreeable odor, becoming fainter by age, and a bitter, aromatic, hot, but not unpleasant taste. Water, alcohol, or proof-spirits, extract its virtues. According to analysis it contains bitter extract, bitter resin, gum, volatile oil, a soft resin, a substance resembling caoutchouc, lignin, and various salts. The volatile oil may be obtained by distillation with water; it is acrid to the taste, odor like the bark, and lighter than water. It also contains nearly 1.5 per cent. of a peculiar, neutral, crystalline principle, named *Cusparin*, which may be obtained by treating an infusion of the bark with absolute alcohol, at common temperatures, and allow it to evaporate spontaneously; the crystals thus obtained are to be purified by repeated crystallization from alcohol, and agitation with ether and hydrated oxide of lead. It forms tetrahedral crystals, is fusible at 112° F., and loses 23.09 per cent. of its weight, is soluble in two hundred parts of cold, and one hundred parts of boiling water, freely soluble in alcohol, but not in ether or volatile oils, readily soluble in the concentrated acids, and more sparingly in the alkalies, and its acid solution yields a whitish precipitate with the tincture of galls. Some years since a poisonous bark was introduced as the true bark, and the administration of which was attended with fatal results. This spurious bark was at first supposed to be the product of the *Brucea Ferruginea*, but is now recognized as the bark of *Strychnos Nux-vomica*. It is known as the FALSE ANGUSTURA BARK, and may be detected by its greater thickness, hardness, weight and compactness, its more intense bitterness without either aroma or pungency; by the appearance of its epidermis, which is sometimes covered with a ferruginous efflorescence, and sometimes is yellowish-gray and marked with prominent white spots; by the brownish-color and smoothness of its internal surface, which is not separable into laminæ, like that of the true bark; and by the white, slightly yellow powder which it yields. When steeped in water it does not become soft like the genuine drug. An excellent method of distinguishing the two barks is by the action of nitric acid, a drop or two of which, applied to either surface of the true bark, produces a dull-red color, but when dropped on the rusty efflorescent

epidermis of the spurious article, induces an emerald-green, and a deep blood-red tint on its internal surface. The false bark is seldom seen in this country.

Properties and Uses.—In large doses, of from twenty to sixty grains, it is emetic and cathartic; in doses of from five to fifteen grains, tonic and febrifuge. Recommended in bilious diarrheas and dysenteries, intermittents, dropsies, etc. It is seldom used, on account of its liability to adulteration with the poisonous bark of the *Strychnos Nux-vomica*, known as the *False Angustura Bark*.

GALIUM APARINE.

Cleavers.

Nat. Ord.—Rubiaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE HERB.

Description.—This plant has many common names, as *Goose-grass*, *Catch-weed*, *Bed-straw*, etc.; it is an annual, succulent plant, with a weak, procumbent, quadrangular, retrorsely-prickled stem, which grows from two to six feet long, and is hairy at the joints. The leaves are one or two inches in length, and two or three lines in width, verticillate in sixes, sevens, or eights, linear-oblongate, nearly sessile, mucronate, tapering to the base, rough on the margins and midvein; peduncles axillary, one or two-flowered. Flowers white, small, numerous, scattered. Calyx four-toothed; corolla rotate, four-parted; stamens four, short; styles two. Fruit large, bristly with hooked prickles.

History.—This plant is common to Europe and the United States, growing in cultivated grounds, moist thickets, and along fences and hedges, and flowering from June to September. Its root consists of a few hair-like fibers, of a reddish color. There are several varieties of this plant, all of which possess similar medicinal virtues, as *Galium Asprellum*, or Pointed Cleavers, which differs from the above in having its leaves in whorls of four or six, and smaller, its fruit smooth, its stem less in length, and is perennial; *Galium Verum*, or Yellow Bed-straw, with an erect stem, leaves in whorls of eight, root long, perennial, fibrous, flowers densely paniculate, yellow, and terminal; *Galium Trifidum* or Small Cleavers, with a perennial root, decumbent stem, herb smaller than the others, leaves in fours or fives, and white flowers.

In the green state these plants have an unpleasant odor, but are inodorous when dried, with an acidulous, astringent, and bitter taste. Cold or warm water extracts the virtues of the plants; boiling destroys them. They have not been analyzed. The roots dye a permanent red, and the plant when eaten by animals, colors the bones similar to madder. The flowers are said to curdle milk, but this property is not constant.

Properties and Uses.—This is another remedy of the Eclectic school of medicine, the virtues of which are not generally known. It is a most valuable refrigerant and diuretic, and will be found very beneficial in many diseases of the urinary organs, as suppression of urine, calculous affections, inflammation of the kidneys and bladder, and in the scalding of urine in gonorrhea. It is contra-indicated in diseases of a passive character, on account of its refrigerant and sedative effects on the system, but may be used freely in fevers and all acute diseases. It has been recommended in scorbutic and nervous affections, but cannot be depended upon. An infusion may be made by macerating an ounce and a half of the herb in a pint of warm water for two hours, of which from two to four fluidounces may be given three or four times a day, when cold. It may be sweetened with sugar or honey. Equal parts of cleavers, maidenhair, and elder-blows, macerated in warm water for two or three hours, and drank freely when cold, form an excellent drink in acute erysipelas, scarlatina, and other exanthematous diseases, in their inflammatory stages.

The infusion made with cold water is also considered very beneficial in removing freckles from the face, likewise lepra, and several other cutaneous eruptions; the diseased parts must be washed with it several times a day, and continued for two or three months in cases of freckles.

Off. Prep.—Infusum Galii.

GAMBOGIA.

Gamboge.

THE CONCRETE JUICE OF AN UNCERTAIN TREE.

History.—In relation to the plant from which this gum-resin is derived we have no correct information. By some, it is laid down as coming from the *Stalagmitis Cambogioides*, upon the authority of Murray, but, Dr. Graham has satisfactorily determined that there is no such plant in existence. It is now supposed to be derived from trees of Ceylon, which produce gum-resins agreeing closely or entirely with the officinal gamboge—these are the *Garcinia Cambogia* and the *Hebradendron Gambogioides*, which last is supposed to be the tree from which it is principally had—though on merely presumptive evidence. The *Heb. Gambogioides* belongs probably to the class and order of the sexual system, *Monœcia Monadelphia*, and to the natural order *Clusiaceæ* or *Guttiferae*. It is a moderate-sized tree, with opposite, petiolate, obovate-elliptical, coriaceous, smooth, entire, and abruptly-acuminate, shining leaves, dark-green above, and paler beneath. The flowers are unisexual, sessile and axillary; the calyx membranous, persistent, and consisting of four sepals; the corolla four-petalled; the fruit is a pleasant, saccharine, quadrilocular berry, about the size of a cherry, crowned with a

sessile stigma, and containing one seed in each division. Incisions are made into the tree, or a large slice is pared from the bark, from which the juice flows, thick, viscid, and bright-yellow, which is scraped off and dried in the sun. If left on the tree, it speedily concretes into dry tears or irregular masses. It is collected in Siam and Cochin-China, and sent to Canton and Calcutta, from which places it is imported into this country.

The best kinds are the *Pipe gamboge*, and *Ceylon gamboge*, which last is seldom had in this country. The pipe gamboge is in cylindrical rolls, from one to two inches in diameter, sometimes hollow internally, doubled, or agglutinated into irregular cakes weighing some pounds, and much flattened. Externally they are striated, of a dull orange color, sometimes of a greenish tinge, derived from the reeds into which they are molded. Pipe gamboge is of a yellow-orange color, which deepens on exposure to the air, brittle with a conchoidal, smooth, and glistening fracture; it possesses but little smell, and a taste at first insipid, but succeeded by an acrid sensation in the fauces. It forms a yellow, smooth, rather persistent emulsion with water, and is soluble in the alkalies, and the essential oils; alcohol dissolves all the resin, leaving the gum; water forms only an emulsion with it. Sulphuric ether dissolves most of the resin, and ammoniated alcohol forms a solution with it which is not disturbed by water. The resin is the active principle. Its specific gravity is 1.221. The strong acids dissolve it, and deposit a yellow precipitate when water is added to the solution. It has been called *Gambogic acid*, as it has the property of combining with salifiable bases. It contains nearly four parts of resin, one of gum, beside water and impurities. Its color, as well as its medical properties, resides in the resin; one part of which will impart a yellowish tinge to ten thousand parts of water or spirit.

A variety called *Cake* or *Lump gamboge* is sometimes imported; it is in irregular masses of two or three pounds, containing many sticks or other impurities, is less brittle than the pipe, vesicular, splintery in fracture, and without luster, but in other respects resembling the finest gamboge. Other varieties are occasionally seen, but they are all of inferior quality. The inferior kinds may be recognized by their many impurities, their greater hardness and coarser fracture, by the brownish or grayish color of their broken surface, which is often marked with black spots, and by the green color imparted to their decoction, when cooled, on the addition of tincture of iodine. The pure gum-resin is completely dissolved by the successive action of ether and water.

Properties and Uses.—In large doses, gamboge is a powerful irritant, causing gastro-enteritis, and death; and is said to produce diffuse inflammation of the cellular tissue, when applied beneath the skin. On account of its severity of action, and its liability to cause serious symp-

toms, it is seldom employed singly, as a purgative; yet when combined with other cathartics it forms a safe and excellent physic. It may, however, be safely administered alone in moderate doses, by reducing it to a state of fine division with other comparatively inert powders, as sulphate, or bitartrate of potassa. It thus operates effectually as a hydragogue, without occasioning much tormina or constitutional exhaustion. In medicinal doses it is a drastic, hydragogue cathartic, causing nausea, griping, and copious watery stools, on which account it is often used in dropsy, in combination with squills, cream of tartar, etc. It has also been used for the expulsion of tapeworm, in torpor of the bowels, dysmenorrhea, etc. Two grains of sulphate of quinia combined with one grain and one-fourth of gamboge, and administered three times a day, have been highly recommended in cases of long-continued constitutional debility, with constipation. United with an alkali, it acts upon the kidneys, and proves diuretic.

Its use is contra-indicated in gastritis, enteritis, during pregnancy, menorrhagia, hemorrhoids, in excited, irritable, or diseased uterus, and where there is irritation or disease of the urinary organs. When taken in large doses, or when it acts with severity, the best remedy to counteract its dangerous effects, is a solution of some alkali, as pearl-ash water, to be followed by general treatment if inflammatory symptoms be present. Dose, in pill, powder, or alkaline solution, from one to fifteen grains; the larger doses given in small quantities, and repeated at short intervals until it operates.

Off. Prep.—Pilulæ Aloës Compositæ; Pilulæ Gambogiæ Compositæ; Pilulæ Podophyllini Compositæ.

GAULTHERIA PROCUMBENS.

Wintergreen.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—This plant is known in various sections of country under different names, as *Mountain tea*, *Deerberry*, *Partridgeberry*, *Checkerberry*, *Teaberry*, *Boxberry*, etc. It is a small, indigenous, shrubby, evergreen plant, with a long, slender, horizontal, creeping root, which sends up at intervals one or two erect, slender, round, reddish *stems*, a few inches in height, naked below, and leafy at the top. The *leaves* are alternate, ovate or obovate, mucronate, remotely denticulate, smooth, coriaceous, shining, acute at each end, evergreen, paler beneath, and revolute at the edges. The *flowers* are few, white, or flesh-colored, three to five on each stem, on terminal, axillary, downy-curved and drooping peduncles. The *calyx* is five-cleft, with two concave, heart-shaped bracts at base, and finally changes into a fleshy covering to the fruit. *Corolla* ovate

or urceolate, contracted at its mouth, five-angled, white or flesh-colored, and divided at its border into five short, acute, reflexed segments. *Stamens* ten, rose-colored, with white, curved, plumose filaments, alternating with the short scales of the receptacle. *Anthers* oblong, orange-colored, ending in two double horns, opening outwardly for their whole length above the filaments; *pollen* white, *ovary* roundish, depressed, five-angled, and resting upon a reddish, ten-toothed, glandular disk; *style* erect, filiform; *stigma* simple, obtuse. The *fruit* is a small, five-celled, five-valved, many-seeded capsule, inclosed in the fleshy calyx, which becomes of a bright scarlet color.

History.—This plant is a native of the United States, growing from Canada to Georgia, and westward to Pennsylvania and Kentucky, in mountainous tracts, dry barrens, and sandy plains, beneath the shade of trees and shrubs, and flowering from June to September. It is never found in rich alluvions or limestone plains. The leaves are officinal, yet all parts of the plant may be used; they have a peculiar aromatic taste and odor, somewhat resembling that of the Sweet Birch bark, (*Betula Lenta*,) with some astringency, and in the berries some sweetness. The berries are eaten by many persons, and form an article of food with partridges, deer, and other wild animals. The astringency of the leaves is owing to the presence of tannic acid; the aromatic properties depend upon a volatile oil, which is separable by distillation. It is the heaviest of the known volatile oils, is colorless at first, but subsequently becomes more or less red, has a specific gravity of 1.173, a burning and aromatic taste, possesses acid properties, and is soluble in alcohol or ether. Water by infusion, and alcohol, extract the virtues of the plant.

Properties and Uses.—Wintergreen possesses stimulant, aromatic, and astringent properties. It is used in infusion in chronic diarrhea, as a diuretic in dysury, as an emmenagogue, as a stimulant in cases of debility, and is said to increase the secretion of milk, but this is doubtful. Its chief use is to flavor syrups, mixtures, etc., for which purpose the oil, or its tincture is generally employed. The oil allays the pain of carious teeth, and large doses of it administered internally have caused death by producing gastric inflammation; the essence of wintergreen is a carminative, and is sometimes used in the flatulent colic of infants. An infusion of the leaves or whole plant, may be drank freely.

The *Gaultheria Hispidula*, or Cancer wintergreen, is supposed to be efficacious in removing the carcinomatous taint from the system; used also in scrofula, prolapsus uteri.

Off. Prep.—Oleum Gaultheriæ.

GELSEMINUM SEMPERVIRENS.

Yellow Jessamine.

Nat. Ord.—Apocynaceæ. Sex. Syst.—Pentandria Digynia.

THE ROOT.

Description.—This plant is likewise known by the names of *Wild Jessamine*, and *Woodbine*; it is the *Bignonia Sempervirens* of Linnæus, and the *Gelseminum Nitidum* of Michaux and Pursh. It has a twining, smooth, glabrous stem, with opposite, perennial, lanceolate, entire leaves, which are dark-green above, and pale beneath, and which stand on short petioles. The flowers are yellow, having an agreeable, but rather narcotic odor, and stand on axillary peduncles. The calyx is very small, with five sepals; the corolla is funnel-form, with a spreading border, and five lobes nearly equal. Stamens five; pistils two. Capsule two-celled, compressed, flat, two-partible. Seeds flat, and attached to the margins of the valves.

History.—This plant was brought into notice, as far as we can learn, in the following manner: A planter of Mississippi, whose name we have forgotten, while laboring under a severe attack of bilious fever, which resisted all the usual remedies, sent a servant into his garden to procure a certain medicinal root, and prepare an infusion of it for him to drink. The servant, by mistake, collected another root, and gave an infusion of it to his master, who, shortly after swallowing some of it, was seized with a complete loss of muscular power, unable to move a limb, or even raise his eyelids, although he could hear, and was cognizant of circumstances transpiring around him. His friends greatly alarmed, collected around him, watching the result with much anxiety, and expecting every minute to see him breathe his last. After some hours, he gradually recovered himself, and was astonished to find that his fever had left him. Ascertaining from his servant what plant it was the root of which acted in this manner, he collected some of it, and employed it successfully on his own plantation, as well as among his neighbors. The success of this article finally reached the ears of some physician, who prepared from it a nostrum called the “Electrical Febrifuge,” which was disguised with the essence of wintergreen. The plant was the Yellow Jessamine, and a knowledge of its remarkable effects was not communicated to the profession until recently.

The Yellow Jessamine abounds throughout the Southern States, growing luxuriantly, and climbing from tree to tree, forming an agreeable shade. On account of its fine yellow flowers, and the rich perfume which they impart to the surrounding atmosphere, as well as the shade it affords, it is extensively cultivated in the gardens of the South as an ornamental vine. The flowers appear from March to May. The root is the officinal part, and yields its virtues to water or alcohol. It is several

feet in length, with scattered fibers, and is from two or three lines in diameter to nearly two inches. The internal part of the root is woody, and of a light yellowish color; the external part, or bark, in which the medicinal virtues are said principally to reside, is of a light snuff-color, and from half a line to three lines in thickness. The root of this plant has been said to contain a resin which is poisonous in very small doses, and a tincture, made by digesting it in undiluted alcohol, is stated to have proved fatal. This statement is denied, and upon good grounds, for were it true, death would necessarily follow the use of the tincture made with undiluted alcohol, in consequence of the presence of this resin which would still be taken up by the alcohol in a proportion corresponding to the alcoholic strength of the solvent. Again, it has been asserted, that the deaths which have occurred where this article was used, were owing, not to the Gelseminum, but to the presence of another very poisonous root, somewhat resembling it, which was carelessly or ignorantly collected and mixed with it. Others again, state that they have given large doses without any serious consequences, and in one case, six fluidrachms of the tincture were swallowed by a lad twenty years of age, without any permanent injury. Notwithstanding these statements, death has followed the employment of what was supposed to be the tincture of gelseminum, in a few instances, and further investigations are required to determine its probable cause, and whether this agent will produce any fatal results in large medicinal doses. Yellow Jessamine may be administered in decoction, infusion, or tincture. It is reputed incompatible with no known substance, but this remains to be satisfactorily determined.

Dr. Hiram H. Hill, formerly of the firm of F. D. Hill & Co., of Cincinnati, has collected many hundreds of pounds of the Gelseminum root in the South. I am indebted to him for the following statement of it. "The length of the Gelseminum root, in clay soil, is from three to ten feet, and on the Magnolia ridges, and along small streams, I have traced some roots to the extent of thirty feet, although the average length is about fifteen. Like the roots of many other vines, it is branching, with scattered fibers, and runs horizontally near the surface of the ground, sometimes merely under the leaves, for several feet. When first pulled up it is very yellow, and has a peculiar odor, like that of the tincture, with a bitter, rather pleasant taste to most persons, at least people were constantly tasting or chewing it, while I was collecting it. The vine is of a green color, and always runs to the top of the tree or bush on which it fastens, then branches out, covering the topmost branches with its thick foliage. I have seen it on trees that were fifty feet in height, and the size of the vine was the same near the top as at the ground; its general length is from twenty to thirty feet. The bark of the vine is full of a silk-like fiber, which is not found in other vines that I have seen. On old vines, the leaves are about one and a half inches in length, of a dark-green color, lance-shaped, and on short footstalks; on young vines

or shoots they are longer and are four or five inches apart, while on the old ones they are very close and always opposite. The flowers are funnel-shaped and yellow. The vine, the root of which is sometimes gathered by mistake for the Gelseminum, resembles it very much in appearance, though it is of a lighter color, and the outer bark is covered with white specks or marks somewhat similar to those on young cherry or peach limbs, and the lower part of the old vines become rough and have small tendrils that fasten upon the bark of trees, and which are never seen on the Gelseminum. The bark of the vine is also more brittle, and the leaves are always on long footstalks which are opposite, at the end of which are two opposite leaves, almost exactly resembling the leaf of the Aristolochia Serpentaria. The root is almost white, very tough, straight, and about the same length of the medicinal root, and has a slightly bitter, disagreeable, nauseating taste. I never saw any of the flowers, though they are said to resemble the others in shape, but are snowy-white, with a slight, unpleasant odor. The vine is called *White Poison Vine*, and *White Jessamine*."

Properties and Uses.—Gelseminum is, undoubtedly, an unrivaled febrifuge, and which appears to be dependent upon its relaxing and antispasmodic properties. Whether it is a narcotic, is not yet satisfactorily established. It has recently been employed in the form of tincture by many respectable physicians, who speak highly of it in all fevers, except the congestive form, in which its use is considered injurious. It has also proved efficacious in nervous and bilious headache, colds, pneumonia, hemorrhages, leucorrhea, chorea, ague-cake, and several other diseases, though it is in fevers especially in which its efficacy has been mostly observed. It is said by some to be the only agent ever yet discovered capable of subduing, in from two to twenty hours, and without the least possible injury to the patient, the most formidable and most complicated as well as the most simple fevers incident to our country and climate, quieting all nervous irritability and excitement, equalizing the circulation, promoting perspiration, and rectifying the various secretions, without causing nausea, vomiting or purging, and is also adapted to any stage of the disease. It may follow any preceding treatment with safety. Its effects are clouded vision, double sightedness, or even complete prostration, and inability to open the eyes, and which gradually pass off in a few hours, leaving the patient refreshed, and completely restored; and as soon as the heaviness or partial closing of the eyes is induced, no more of the remedy is necessary, although these effects should even follow the first dose. If carried to such an extent that the patient cannot open his eyes, the relaxation may be too great for the system to recover from, hence its use should cease, as soon as the symptoms above-named have been produced.

The tincture is the form in which it is employed; the dose is from ten to fifty drops, in a wineglass half-full of water, to be repeated every two hours; the second dose, in the majority of cases, usually effecting the cure. From two to ten grains of quinia, according to the severity and character of the disease, should accompany each dose, or it is said the system will again relapse into the febrile state, in a few hours, for want of tonicities following the relaxation produced by the remedy. The original discoverers of the use of the article say, however, that the quinia is not actually necessary, but that its addition renders the cure more prompt, and, by its combination, its usually unpleasant effects, as determination to the head, etc., are completely obviated. When the fever does not yield in six hours, a mild purgative may be administered, or podophyllin in small doses, may be added to the medicine; if diarrhea be present, add an opiate to it.

In the treatment of typhus and typhoid fevers, it should be given in smaller doses, say from three to eight drops of the tincture, with from two to four grains of sulphate of quinia, and repeated every two or three hours until the more active febrile symptoms subside; then give one or two grains of the quinia, every two hours, and eight or ten drops of the tincture of Gelseminum, every six or eight hours. A writer observes, that his experience in the treatment of fevers, with this agent, inclines him to believe that when given in doses sufficiently large to produce its full and complete constitutional effects, it impairs the tonicity of the muscular fibers of the heart (which are always weakened in those fevers), and thus retards or prolongs convalescence.

Gelseminum possesses a most perfect control over the nervous system, removing nervous irritability more completely than any other known agent. It may be used in all forms of neuralgia, nervous headache, toothache, and lockjaw or tetanus. It is recommended in this last difficulty, as an agent that may be relied upon with definite certainty. In gout and rheumatism, it may be advantageously added to the tinctures of guaiacum, or of colchicum. Combined with mild diuretic and secernent agents, nephritic and cystic irritability, and leucorrhea, have readily yielded.

Upon the uterus it appears to exert an opposite influence, for while it produces complete and powerful relaxation of every other tissue, it tends to promote contraction of the uterus; causing an influence intermediate between ergot and cimicifuga, it being less energetic than the former, and more so than the latter. This property, when continued, as it is, with its relaxing effects upon every other tissue, promises to render it an important aid in parturition.

Externally, the tincture will be found of service, in neuralgic and rheumatic pains. Its internal administration is contra-indicated in congestive fever, in cases where there is great muscular or nervous prostration with relaxation, and when there exists a determination to the brain

or other important viscus. Like all newly discovered agents which possess active and efficacious influences, this has probably been too highly lauded, yet if one-half of the virtues reported to exist in this plant are true, it is certainly deserving the close investigation of all classes of physicians.

Off. Prep.—Tinctura Gelsemini.

GENTIANA LUTEA.

Gentian.

Nat. Ord.—Gentianaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This plant has a long, thick, cylindrical, wrinkled, ringed, forked, perennial root, brown externally, and yellow within. The *stem* is three or four feet high, simple, erect, round, hollow, and somewhat annulated at base. The *radical leaves* are narrowed at the base into the form of a petiole, ovate-oblong, five-nerved, plaited, and two or three inches broad; the *cauline leaves* are sessile, ovate, concave, acute, smooth, pedunculate, in dense whorls, and of a yellowish-green color; the *leaves next the flowers* are cordate, amplexicaul, concave; all a pale, bright green. The *flowers* are large, bright yellow, peduncled, and in whorls at the axils of the upper leaves. The *calyx* is monophyllous, membranous, yellowish, semi-transparent, three or four cleft, with short, lanceolate, unequal segments. The *corolla* is rotate, with a very short tube, five or six green glands at the base, and divided into five or six long, narrow, veiny, spreading segments. The *filaments* vary from five to eight, are shorter than the corolla, and alternate with its segments, and are furnished with long, erect, subulate, somewhat united anthers. The *ovary* is conical, supporting two sessile, reflected stigmas. The *capsule* is conical, two-valved, one-celled, containing numerous, small, roundish, compressed seeds, with brownish membranous edges.

History.—This plant grows among the Alps, Appenines, Pyrenees, and other mountainous regions of Europe. The root is the only part used in medicine, and is imported from Germany. It is met with in pieces of various sizes, seldom above an inch in thickness, split lengthwise if large, marked with annular wrinkles, and longitudinal furrows; sometimes it is met with in transversely cut pieces. It consists of an external reddish-yellow layer, separated by a dark reddish-brown line, and a grayish-yellow, or reddish spongy center. It has a feeble, aromatic odor, and a taste at first faintly sweetish, and then purely intensely and permanently bitter. It imparts its virtues readily to cold or hot water, alcohol, wine, spirit, or sulphuric ether. It contains according to Henry and Caventou, *gentianin*, a volatile odorous principle, a substance

analogous to birdlime, a greenish fixed oil, a free organic acid, uncrystallizable sugar, gum, yellow-coloring matter, pectic acid, and lignin. The gentianin, so named by Henry and Caventou, from a supposition that it was the active principle of the root, has been shown, by M. Leconte, to be impure genistic acid, and is, when quite pure, destitute of bitterness and medicinal power. It may be obtained in pale-yellow, needle-shaped crystals, insoluble in water, and soluble in alcohol, by treating the alcoholic extract of gentian, previously exhausted by water, with sulphuric ether, filtering the ethereal solution, and allowing it to evaporate spontaneously. M. Leconte also considers the *birdlime* or *glue* to be a combination of wax, oil, and caoutchouc. When distilled with water, gentian yields a minute quantity of concrete oil, having the odor of the root. When the root is macerated in cold water, on the addition of yeast to the infusion vinous fermentation ensues, from which a bitter liquor is obtained by distillation, much prized in some parts of Switzerland as a stomachic.

The bitter principle of the root may be obtained by macerating the alcoholic extract in water, and then subjecting the solution to the vinous fermentation in order to separate the sugar. It is then to be treated with acetate of lead, filtered, and treated with subacetate of lead and a very little ammonia, in order to precipitate the combination of the vegetable principle with oxide of lead; if too much ammonia be added, in consequence of its stronger basic powers, it will separate the vegetable principle from the oxide. The precipitate obtained is to be washed with a little water, then mixed with a large proportion of the same fluid, and decomposed by hydrosulphuric acid. The liquid is to be filtered, evaporated to dryness with a gentle heat, the residue treated with alcohol of 0.820, and the alcoholic solution evaporated. This gives a brownish-yellow, uncrystallizable substance, very bitter, almost insoluble in absolute alcohol, soluble in ordinary alcohol, and very soluble in water. It possesses acid properties. *Gentianin* is the name proposed for it.

Properties and Uses.—A powerful tonic, excites the appetite, invigorates digestion, and moderately increases the circulation and temperature of the body. Used in cases of debility and exhaustion, and in all cases where a tonic is required, as dyspepsia, gout, amenorrhea, hysteria, scrofula, intermittents, diarrhea, worms, etc. Dose of the powder, from ten to thirty grains; of the extract, from one to ten grains; of infusion, one or two fluidounces; of tincture, one or two fluidrachms. When taken in large doses, it is apt to oppress the stomach, irritate the bowels, and even produce nausea and vomiting. Its administration is contra-indicated where gastric irritability is present.

Dr. Kuchenmeister believes that impure and uncrystallized gentianin is the most valuable substitute for quinia, acting as rapidly, and as efficaciously on the spleen, in doses of from fifteen to thirty grains twice a day.

GENTIANA CATESBEI, *Blue*, or *American Gentian*, has a perennial, branching, somewhat fleshy *root*, with a simple, erect, rough *stem*, eight or ten inches in height. The *leaves* are opposite, ovate or lanceolate, slightly three-veined, acute, rough on the margin. *Flowers* large, blue, crowded, subsessile, axillary, and terminal. *Calyx* divided into four or five linear-lanceolate segments, which are longer than the tube. *Corolla* large, blue, ventricose, plaited; its border divided into ten segments, of which the outer five are roundish and more or less acute, and the inner five bifid and imbricate. *Stamens* five, with dilated filaments and sagittate anthers. *Ovary* oblong-lanceolate, compressed, supported by a sort of pedicel. *Style* none; *stigmas* two, oblong, reflexed. *Capsule* oblong, acuminate, one-celled and two-valved. This plant grows in the grassy swamps and meadows of North and South Carolina, flowering from September to December. The root is little inferior to the foreign gentian, and may be used as a substitute for it in all cases, in the same doses and preparations. Alcohol and boiling water extract its virtues. Probably the *Gentiana Saponaria*, or Soapwort Gentian, the *Gentiana Pneumonanthe*, or Marsh Gentian, and the *Gentiana Crinita*, or Blue Fringed Gentian, possess analogous medicinal virtues.

Off. Prep.—Extractum Gentianæ; Extractum Gentianæ Fluidum; Vinum Symphyti Compositum.

GENTIANA OCHROLEUCA.

Ochroleucous Gentian.

Nat. Ord.—Gentianaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT AND TOPS.

Description.—This plant is likewise known by the names of *Marsh Gentian*, *Yellowish-white Gentian*, *Straw-colored Gentian*, *Sampson Snake-root*, etc.; it has a stout, ascending *stem*, mostly smooth, and from one to two inches in height. The *leaves* are from two to four inches long, by three-quarters of an inch to an inch and a half wide, obovate-oblong, sessile or amplexicaul, margins slightly scabrous, and narrowed at the base; the lowest are broadly ovate and obtuse, the uppermost somewhat lanceolate. The *flowers* are straw-colored, two inches long by three-quarters of an inch thick, and disposed in a dense terminal cyme, and often also in axillary cymes. The *calyx* is five-cleft, the *lobes* unequal, linear, longer than the tube, and shorter than the corolla. The *corolla* is clavate, connivent or slightly expanding at top, ochroleucous or straw-color, with green veins and lilac-purple stripes internally; its *lobes* ovate, obtuse; the *folds* entire, acute, short. *Anthers* separate. *Capsule* or *pod* included in the persistent corolla. Seeds entirely wingless.

History.—This plant is found growing in dry grounds, especially through the middle and low country of the Southern States, flowering

in September and October. Said likewise to inhabit Canada and the Western States, but this must be rare. The root is the officinal part, and the tops are also often employed. They are bitter to the taste, and probably possess the medicinal properties, in a greater or less degree, of the preceding plants of the same family. Alcohol or boiling water extracts their virtues. None of the American gentians have been satisfactorily analyzed.

Properties and Uses.—Bitter tonic, anthelmintic, and astringent. Used in dyspepsia, intermittents, dysentery, and all diseases of periodicity. To two ounces of the tops and roots, pour on one and a half pints of boiling water, and when nearly cold, add half a pint of brandy. Dose, from half a fluidounce to four fluidounces, every half hour, gradually increased as the stomach can bear it, at the same time lengthening the intervals between the doses. Also used for bites of snakes, and in typhus fevers, pneumonia, etc.

GERANIIN.

Geraniin.

THE CONCENTRATED EXTRACT OF GERANIUM MACULATUM.

Preparation.—Geraniin is obtained by making a saturated tincture of the root of *Geranium Maculatum*, filtering, distilling off a part of the alcohol, adding water to the rest, and evaporating to dryness. The operation is similar to that for preparing podophyllin.

History.—Geraniin is especially an Eclectic remedy, and is but little known among the other schools of medicine. It was first prepared by Mr. Wm. S. Merrell, of Cincinnati. It is a black substance, forming a dark-brown, glistening powder, of a faint odor, somewhat like that of molasses, and an astringent, acidulous taste, leaving a flavor in the mouth somewhat resembling that of good green tea. Cold water added to it does not appear to dissolve any, but when filtered gives an acid reaction, turning blue litmus paper red, and on the addition of sulphate of iron becomes a deep-bluish black, forming a good writing ink. Ammonia added to water in which geraniin is placed, partially dissolves it; liquor potassa added, completely dissolves it forming a black solution; muriatic acid added, does not affect its solution at all. It is very little soluble in alcohol, imparting to it a light reddish-yellow tinge, and on the addition of ammonia, more of the geraniin is dissolved, and the rest is held in a state of suspension in the liquid. It is insoluble in ether, chloroform, and oil of turpentine; acetic acid added to ether partially dissolves it, causing a reddish solution; ammonia added, does not render it any further soluble, and the clear ether floats on the top. Its composition is not yet determined, though it undoubtedly contains an abundance of tannic or gallic acids.

Properties and Uses.—Geraniin is a powerful astringent, and unlike tannic acid in its action, does not cause a dryness of the mucous surfaces with which it comes in contact, but produces its therapeutical influences upon them with the continuance of their natural moisture. On this account, and in connection with its not unpleasant taste, it will, undoubtedly, in a short time, supersede the use of tannic acid in most of the diseases in which this acid is employed. Geraniin may be employed in all instances where astringents are indicated. It has been found a superior article both in the first and second stages of dysentery, diarrhea, and cholera-morbus. Equal parts of geraniin, dioscorein, and caulophyllin, will be found a valuable mixture in diarrhea and cholera-morbus, when much pain and flatulency are present; the mixture may be given in six grain doses to an adult, every fifteen or twenty minutes, or as often as the urgency of the case may require. Geraniin will be found efficacious in hemorrhages, hematuria, menorrhagia, leucorrhea, gleet, diabetes, etc. In colliquative diarrhea it answers an excellent purpose either alone, or in combination with quinia. Externally, it may be applied to ulcers, and combined with alum and gum arabic, it forms an excellent application to bleeding wounds and in epistaxis. All practitioners who have used this article in their practice, speak in the highest terms of its efficacy as an astringent. Dose of Geraniin, from one to five grains or more, repeated as required; it may be given in syrup, molasses, gruel, water, or Port wine.

GERANIUM MACULATUM.

Geranium.

Nat. Ord.—Geraniaceæ. *Sex. Syst.*—Monadelphia Decandria.

THE ROOT.

Description.—This plant is also known by the names of *Cranesbill*, *Spotted-geranium*, *Wild-Cranesbill*, *Crowfoot*, *Alum-root*, etc. It has a perennial, horizontal, thick, rough, knobby and fleshy *root*, with short fibers, and sends up annually one or more erect, angular, or round, retrorsely pubescent, herbaceous, dichotomous *stems*, from one to two feet high, and of a grayish green color. The *leaves* are spreading, hairy, palmate, with three, five, or seven deeply cleft lobes; two leaves at each fork; the *lobes* are cuneiform and entire at the base, incisely serrate above. The radical-leaves are on long petioles, erect and terete; the leaves at the top are opposite and subsessile, and those at the middle of the stem are opposite, petiolate, and generally reflexed. The *stipules* are linear or lanceolate. The *flowers* are large, and generally purple, mostly in pairs, on unequal pedicels, sometimes umbelled at the ends of the peduncles. *Peduncles* long, round, hairy, tumid at base, and arise from the dichotomous divisions of the stem. The *calyx*

consists of five oval, lanceolate, ribbed, cuspidate *sepals*, plumosely ciliate on their outer margin, and membranaceous on the other; sometimes three only of the sepals are ciliate. The *petals* are five, obovate, entire, light purple, marked with green at the base. The *stamens* are ten, erect or curving outward, alternately longer, furnished at the base with glands, and terminated by oblong, convex, deciduous, purple anthers. The *ovary* is ovate, bearing five *styles*, at first about the length of the stamens, but finally longer,—they cohere to a permanent central axis before maturity, but separate from it in a twisted form when the seed is ripe. *Stigmas* five, at first erect, afterward recurved. The *fruit* consists of five aggregated, one-seeded capsules, attached by a beak to the persistent style, and curling up and scattering the seeds when ripe.

History.—Geranium is an indigenous plant, growing in all parts of the United States in open woods, thickets and hedges, flowering from April to June. There are several varieties of this species which are probably equivalent in medicinal virtues to the *G. Maculatum*. The root is the officinal part, and should be collected late in the autumn. When dried it is in pieces, from one to three inches in length, and from a quarter to half an inch in diameter, somewhat flattened, contorted, wrinkled, tuberculated, and beset with slender fibers. It is of an umber-brown color externally, reddish-gray internally, compact, of an astringent taste, without bitterness or other unpleasant flavor. Water or alcohol extracts its virtues. It contains a considerable amount of tannin and gallic acid, some mucilage, amadin, red coloring matter from the cortex, a small quantity of resin, and a peculiar crystallizable principle. A concentrated article is prepared from it, and used by Eclectics under the name of *Geraniin*.

Properties and Uses.—A powerful astringent. Used in the second stage of dysentery, diarrhea, and cholera infantum in infusion with milk. Both internally and externally it may be used wherever astringents are indicated, in hemorrhages, indolent ulcers, aphthous sore mouth, ophthalmia, leucorrhea, gleet, hematuria, menorrhagia, diabetes, and all excessive chronic mucous discharges; also, to cure mercurial salivation. A decoction of the root may be used as a gargle in relaxation of the uvula, and aphthous ulcerations of the throat. As it is void of unpleasant taste or other offensive qualities, it is peculiarly serviceable in the cases of infants, or persons with very delicate stomachs. In cases of bleeding piles, a strong decoction of the root may be injected into the rectum, and which should be retained as long as possible. Piles are said to be cured by adding of the root in fine powder, two ounces, to tobacco ointment seven ounces, and apply to the parts, three or four times a day. Troublesome epistaxis, bleeding from wounds or small vessels and from the extraction of teeth, may be checked effectually by applying the powder to the bleeding orifice, and if possible, covering with a compress of cotton. With Aletris Farinosa in decoction, and taken

internally it has proved of superior efficacy in diabetes and in Bright's disease of the kidney. A decoction of two parts of *Geranium* and one of *Sanguinaria* forms an excellent injection for gleet and leucorrhea. Dose of the powder, from twenty to thirty grains; of the decoction, from one to two fluidounces. The *Geranium Robertianum*, or Herb Robert, grows wild both in Europe and the United States, but is rare in this country; and Pursh states that the American plant is destitute of the heavy smell by which the European is so well known, though the two agree in all other respects. It has a tapering root, with several round, leafy, branched, reddish, brittle, succulent, and diffuse stems, hairy, chiefly on one side. The leaves are opposite, shining, petiolate, more or less hairy, three to five cleft to the base, the segments pinnatifid, and the pinnæ incisely-toothed. The flowers are small, in pairs, pale-purple, occasionally white, and situated on lateral and terminal peduncles. Calyx brownish, hairy, with ten angles when closed. Petals obovate, entire. Sepals mucronate-awned, half as long as the entire petals. Stamens awl-shaped, smooth. Capsules small, obovate, downy, carinate, curiously-marked at the outer edge with elevated interbranching wrinkles. Seeds smooth and even. The plant is in flower from May to September, and has a strong unpleasant smell. The herb has a disagreeable, bitterish, astringent taste, and imparts its virtues to boiling water. It has been used internally in intermittent fever, consumption, hemorrhages, nephritic complaints, jaundice, etc.; and has been employed as a gargle in affections of the throat, and applied externally as a resolvent to swollen breasts and other tumors.

GERARDIA PEDICULARIA.

Bushy Gerardia.

Nat. Ord.—Scrophulariaceæ. Sex. Syst.—Didynamia Angiospermia.

THE HERB.

Description.—This is the *Dasystema Pedicularia* of Bentham; it is a perennial plant, known also by the names of *Feverweed*, *Lousewort*, *American Foxglove*, etc. Its stem is tall and bushy, with a scattered, woolly pubescence, two or three feet in height, and brachiate-panicled. The leaves are numerous, opposite, ovate-lanceolate or oblong, pinnatifid, the segments doubly cut-dentate. The flowers are large, yellow, axillary, trumpet-shaped, opposite, and pedicelled; pedicels longer than the calyx. The calyx is five-cleft, cut-dentate, segments as long as the hairy tube. The corolla is yellow, an inch or more in length, sub-campanulate, unequally five-lobed, segments mostly rounded, spreading, leaf-like, and woolly inside. Capsule two-celled, dehiscent at the top.

History.—This is a most elegant plant found growing in dry copses, pine ridges, and barren woods and mountains from Canada to Georgia

and Kentucky, and flowering in August and September. The whole plant is used. Water or spirits extracts its virtues. It has not been analyzed. There are several varieties of the species, which probably possess analogous virtues.

Properties and Uses.—Diaphoretic, antiseptic, and sedative. Used principally in febrile and inflammatory diseases; a warm infusion produces a free and copious perspiration in a short time. Dose of the infusion, from one to three fluidounces.

Off. Prep.—Infusum Gerardiae.

GEUM RIVALE.

Water Avens.

GEUM VIRGINIANUM.

White Avens.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Polygynia.

THE ROOT.

Description.—*Geum Rivale*, likewise known as *Purple Avens*, has a perennial, horizontal, somewhat woody, scaly, jointed, tapering root, of a reddish-brown color externally, white internally, six or eight inches in length, and furnished with numerous descending yellow fibers. The stems are one or more from the same root, erect, nearly simple, pubescent, of a purplish color, paniculate at top, and from one to two feet in height. The radical leaves nearly lyrate, and uninterruptedly pinnate, with large terminal leaflets on long hairy petioles, rounded, lobed and crenate-dentate, and from four to six inches long. The cauline leaves are few, subsessile, from one to three inches long, and divided into three serrate, pointed segments; stipules ovate, acute, cut, purplish. The flowers are few, subglobose, nodding, yellowish-purple, and stand on axillary and terminal peduncles. The calyx is inferior, erect, purplish-brown, with ten lanceolate pointed segments, with five alternately smaller than the others. The petals are five, as long as the erect calyx segments, broad-obcordate, clawed, purplish-yellow, veined. The seeds are oval, with plumose awns, minutely uncinat, and nearly naked at the summit. This species is common to Europe and the United States, and is found growing in woods, wet meadows, and along streams, especially in the Northern and Middle States, and flowering in June and July. The American species differs from the European in having smaller flowers, petals more rounded on the top, and the leaves more deeply incised. The fresh root is aromatic.

GEUM VIRGINIANUM, also known as *Throat-root*, *Chocolate-root*, etc., has a perennial, small, brown, contorted, horizontal root, with an erect

stem about two feet high, simple or branched, pubescent, and few flowered. The *radical leaves* are on long petioles, without stipules, pinnate, lyrate, or simple and rounded, usually three-foliate; the *folioles* oval or oval-lanceolate, acute at the base, and acuminate, deeply and unequally serrate. The *cauline leaves* are on shorter petioles, furnished with large stipules, three to five-lobed; the *upper leaves* simple, acute, sessile; all are unequally and incisely dentate, nearly smooth, or softly pubescent. The *flowers* are quite small, white, on erect peduncles. The *calyx* subcampanulate, deeply five-cleft, with five exterior alternate bracteoles. The *petals* are five, yellowish-white, not exceeding the length of the calyx, and inserted into it. *Stamens* numerous, short, unequal; *filaments* filiform; *anthers* roundish and yellow. *Styles* numerous, long, hairy, geniculate above the middle, lower portion glabrous, persistent, uncinat after the upper portion falls off. *Fruit* a cluster of dry achenia, which are oval, brown, smooth, having a tail or awn formed of the persistent styles, twisted and uncinat at apex. This plant is found in hedges and thickets, and in moist places, in most parts of the United States, flowering from June to August.

History.—These plants, with some other varieties, have long been used in domestic practice. The whole herb contains medicinal properties, but the officinal and most efficient portion is the root. The dried root of the *G. Rivale* is scaly, jointed, tapering, hard, brittle, easily pulverized, of a reddish or purplish color, and inodorous; that of the *G. Virginianum* is brown, crooked, tuberculated, and brittle; both are white internally, and of a bitterish, astringent taste. Boiling water or alcohol extracts their virtues, the solution becoming reddish. They have not been analyzed, but probably contain tannic acid, bitter-extractive, gum, resin, etc. A weak decoction of the root of *G. Rivale* is sometimes used by invalids as a substitute for tea and coffee.

Properties and Uses.—Tonic and astringent. Used in numerous diseases, as passive and chronic hemorrhages, chronic diarrhea and dysentery, leucorrhea, dyspepsia, phthisis, congestions of the abdominal viscera, intermittents, aphthous ulcerations, etc. Dose of the powder, from twenty to thirty grains; of the decoction, from one to two fluid-ounces, three or four times a day.

The *Geum Urbanum*, or European Avens, possesses similar properties.

GILLENIA TRIFOLIATA.

Indian Physic.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Pentagynia.

THE BARK OF THE ROOT.

Description.—Indian Physic is an indigenous, herbaceous plant, with a perennial root, composed of a great number of long, slender, brown

fibers, arising in a radiated manner, from a brown, irregular, thick tuber-like head or caudex. Some of these fibers are knotted or annulated for some distance as in the true *ipecacuanha*. The *stems* vary in number from one to several from the same root, are about two or three feet in height, erect, slender, flexuose, smooth, branched above, and of a reddish or brownish color. The *leaves* are alternate, trifoliate, subsessile, furnished with small linear-lanceolate, slightly-toothed stipules at the base; the *leaflets* are lanceolate, acuminate, sharply and unequally toothed, the upper ones often single, the lower broader at the end, but acuminate terminated. The flowers are white, with a reddish tinge, in terminal, loose panicles, few in number, scattered, on long peduncles, and occasionally furnished with minute lanceolate bracts. *Calyx* subcampanulate or tubular, terminating in five sharp reflexed segments. *Petals* five, the two upper ones separated from the three lower, white with a reddish tinge on the edge, lanceolate, unguiculate, contracted and approximated at base, and three times as long as the calyx. *Stamens* are about twenty, in a double series within the calyx, with short filaments, and small and yellow anthers. The *styles* are five, with obtuse stigmas. *Capsules* five, connate at base, oblong, acuminate, diverging, gibbous without, sharp edged within, two-valved, one-celled, one or two-seeded; seeds oblong, brown, bitter.

History.—This plant is found growing from Canada to Florida, east of the Alleghany mountains, in hilly woods, in light, gravelly soils, and in moist and shady situations. It flowers in June and July. The root is the officinal part, and should be collected in September; when dried it is about the thickness of a quill, wrinkled longitudinally, sometimes irregular or knotty, of a light brown color externally, and consists of a thick, somewhat reddish, brittle, cortical portion, and an internal whitish, ligneous cord. The cortical part is readily pulverizable. It has a feeble odor, and a nauseous, bitter taste. Its properties are extracted by alcohol or boiling water. It affords a light brownish powder. The bark is the active portion, the internal woody substance being nearly inert. According to Mr. Shreeve, it contains starch, gum, resin, wax, a fatty matter, a red-coloring substance, a volatile coloring matter, and a peculiar principle soluble in alcohol and dilute acids, but insoluble in water or ether.

The *Gillenia Stipulacea*, or Bowman's root, which is found on the western side of the Alleghany mountains, growing through Ohio, Indiana, Illinois, Missouri, and southward, and occupying the place of the *G. Trifoliata*, possesses similar properties, but is more certain in its effects in the same doses. It may be distinguished by being larger and more bushy than the preceding; the stems brownish and branched; the upper leaves trifoliate, the folioles lanceolate, incised, and serrate; the lower leaves more deeply incised, becoming pinnatifid toward the root, and

of a reddish-brown color at the margin; the stipules are ovate, acuminate, deeply serrate, foliate, and the flowers are smaller, and placed on long slender peduncles in a lax corymb. It is rare in calcareous or alluvial regions, but is common in hilly and sandstone districts. Its root resembles the eastern species.

Properties and Uses.—The root-bark of these plants is emetic, cathartic, sudorific, expectorant, and tonic. In their action, they resemble ipecacuanha. They have been recommended in amenorrhea, rheumatism, dropsy, habitual costiveness, dyspepsia, worms, and in intermittents. As an emetic and cathartic, from twenty to thirty-five grains is a dose, which when vomiting is required, may be repeated at intervals of twenty minutes. It may be used in all diseases where emetics are indicated, as a safe and efficacious agent. In dyspepsia, accompanied with a torpid condition of the stomach, from two to four grains form an excellent tonic. As a sudorific, six grains may be given in some cold water, and repeated at intervals of two or three hours, or it may be given in combination with a small portion of opium. The infusion, repeated as often and as largely as is general in domestic practice, is objectionable, as it is apt to produce hyper-emesis and catharsis.

GLUE.

Glue.

AN IMPURE FORM OF GELATIN.

History.—Gelatin is found in abundance in various animal substances, especially in the skin, cartilages, tendons, membranes, and bones; it may be obtained by boiling these solid animal parts, in water, straining the decoction, and evaporating it, until it assumes the consistence of jelly on cooling. This is divided into thin slices of various sizes, which are allowed to dry in the open air. The gelatinous matter of the cellular tissue and membranes, is insoluble in cold water and acids, and combines with corrosive sublimate, persulphate of iron, alum, and other salts, forming insoluble compounds which do not putrefy; gelatine itself readily putrefies. The gelatin obtained from the skin when moist, combines with tannic acid, if steeped into a solution of the acid, and is converted into leather. The gelatin of the cartilages is termed *Chondrin*. That from the air-bladder of fishes forms isinglass, which is the purest variety of gelatin. (*See Isinglass.*) The common gelatin of commerce, called *glue*, is prepared from cuttings of parchments, or the skins, ears, bones, and hoofs of animals. When pure gelatin, one part, is dissolved in one-hundred parts of hot water, a jelly is formed when it cools.

Glue of good quality is hard and brittle, not easily pulverized, of a light brown color, and equally translucent throughout. On the addition

of water, it softens and swells, but does not dissolve except by boiling; hot water dissolves it slowly. When dissolved in hot water, it is much in use for cementing pieces of wood, and various other substances together, but is too impure for internal use or for a chemical test. By the addition of nitric acid to a solution of glue, a cement or liquid glue is obtained, which does not require the aid of heat to render it fit for use. (*See Nitric Acid.*)

Properties and Uses.—Glue has been introduced here, in consequence of its application in pharmacy for the purpose of promoting certain useful indications. Several remedial agents of a valuable character, are unfortunately so offensive to the taste, as to produce nausea and vomiting whenever swallowed, and as in many instances it is almost impossible to dispense with them, an important object is to prepare them so as to prevent their coming in contact with the tongue and palate. This has been accomplished, as far as liquid medicines are concerned, by the formation of *capsules of gelatin*, invented by M. Dublanc, of Paris.

The purest kind of glue is used in manufacturing these capsules, and which is accomplished in the following manner:—Very smoothly round the end of a cylinder of iron or hard wood which is four lines in diameter, and a few inches in length, dip half an inch of this end into a saturated alcoholic solution of soap kept warm, then, when the layer of soap has concentered, dip it into a strong hot solution of sweetened and aromatized gelatin, and which may be repeated two or three times according to the thickness desired; place them vertically on boards to cool, and before complete desiccation, remove the capsule by a screwing motion, place it with others on sieves, and dry by a stove heat. The top to this is made in the same way, but shorter and a trifle wider; and when the body is filled with the medicine, the top is placed upon it, being made to unite by rubbing over the line of junction, a camel's hair-brush moistened with hot water.

Or they may be prepared in another manner, as follows:—"Small pouches made of fine skin, of an oval form, are attached by a waxed thread to the smaller extremity of a hollow elongated metallic cone, which is bent toward its point, and has its base closed by a cover, which is screwed so as to make the instrument air-tight. Into this conical tube sufficient mercury is poured to fill the pouch, which, thus distended, is dipped into a concentrated sweetened solution of glue, and afterward exposed to heat in a vertical position, so as to dry the layer of gelatin which it has received. In the same manner a second coating may be given, and the process again repeated, till a sufficient thickness has been obtained. The cone being then reversed, the mercury flows out of the pouch, which collapses and allows the capsule of gelatin to be removed. Into this the medicine may now be introduced, care being taken to avoid any contact between it and the outer surface of the capsule. The opening is next to be closed by means of a thin lamina of gelatin previously

softened by steam; and a solution of the same substance should be applied to the edges by means of a camel's hair-pencil." In this way capsules may be made to contain from ten to twenty grains of liquid. When received into the stomach, the gelatin is dissolved, allowing the medicine to accomplish its therapeutical influences. For another method see Capsules, in *Mohr and Redwood's Pharmacy* by *Proctor*.

GLYCERINA.

Glycerin.

THE SWEET PRINCIPLE OF OILS.

Preparation.—Take of Lead Plaster, recently prepared and yet fluid, and Boiling Water, of each, one gallon. Mix them, stir briskly for fifteen minutes, then allow them to cool, and pour off the supernatant fluid. Evaporate this until it has the specific gravity 1.15, and pass a current of sulphohydric acid slowly through it until a black precipitate is no longer produced. Filter, and boil until the sulphohydric acid is driven off. Lastly, evaporate the liquid until it ceases to lose weight. Or it may be prepared by digesting equal parts of ground litharge, (protoxide of lead), and olive oil with a little boiling water, stirring and adding water as it evaporates. When it is of the consistence of soft plaster, it is to be well washed with hot water. Decant and filter, then pass sulphureted hydrogen through the mass, in order to throw down the lead; after which, filter, and evaporate to a syrup in a water bath. The syrupy product is glycerin, and looks a little like mucilage of gum arabic.

The following mode of preparing glycerin is by Campbell Morfit, M. D., who says:—Glycerin is generally made, on the large scale, either by directly saponifying oil with oxide of lead, or from "the waste," or spent leys of the soap-makers. The first mode of obtaining it is complex and expensive, while in the latter the difficulty of wholly separating the saline matters of the "waste," renders it impossible to obtain a perfectly pure product. In view of these obstacles, and the increasing demand for the article, both in medicine and perfumery, I submit a new process, which has been found, by actual practice, to combine the great and desirable advantages of economy of time, labor, and money.

Take one hundred pounds of oil, tallow, lard, or "stearin" (pressed lard), place it in a clean iron-bound barrel, and melt it by the direct application of a current of steam. While still fluid and hot, add fifteen pounds of lime, previously slaked and made into a milk with two and a half gallons of water, then cover the vessel, and continue the steaming for several hours, or until the completion of the saponification. This is known when a sample of the resulting and cooled soap gives a smooth and lustrous surface on being scraped with the finger-nail, and breaks

with a cracking noise. By this treatment, the fat is decomposed, its acids unite with the lime to form insoluble lime soap, while the eliminated glycerin remains in solution in the water along with the excess of lime. After it has been sufficiently boiled, it is allowed to cool and settle, and it is then to be strained through a crash cloth. The soap is reserved for sale to stearic candle-makers, or else may be reconverted into a saleable fat by the process given at pp. 432, 445 Morfit's "Applied Chemistry."

"The strained liquid contains only the glycerin and excess of lime. It must be carefully concentrated by steam heat. During evaporation, a portion of the lime is deposited on account of its lesser solubility in hot than cold water. The remainder is removed by treating the evaporated liquid with a current of carbonic acid gas, boiling by steam heat, to convert any soluble *bi*-carbonate of lime that may have been formed, into insoluble neutral carbonate, allowing repose, decanting or straining off the clear supernatant liquid from the precipitated carbonate of lime, and further evaporating, as before, if necessary, to drive off any excess of water. As nothing fixed or injurious is employed in the process, the glycerin thus prepared will be absolutely pure."—*Silliman's Journal*.

History.—Glycerin was discovered by Scheele, who called it the sweet principle of oils and fats. When perfectly pure and anhydrous, glycerin is colorless, or straw-colored, having a sweet taste and syrupy consistence, with a faint but not disagreeable odor. It combines readily with water, alcohol, or oils; dissolves many gums and resinous substances; does not crystallize, nor ferment like sugar; will not evaporate beyond a certain point, and is destroyed by boiling. It is insoluble in fatty matter, and can only be incorporated with it mechanically, to effect which, it is necessary that the fat should have a soft consistence, which may be imparted to it by combining it with oil of sweet almonds, or some other fixed oil. It is insoluble in ether, does not evaporate on exposure to the air, and becomes decomposed by distillation. It burns with a blue flame when exposed to a full red heat. It forms *sulphoglyceric acid* with sulphuric acid, and in union with sulphuric and nitric acids it is converted into a liquid called *Pyroglycerin*, which is explosive and very poisonous. Diluted with water, the absence of lead may be determined by its affording no precipitate with hydrosulphate of ammonia; and that of iron by not precipitating with ferrocyanuret of potassium. Its formula is $C_3H_7, O_5 + HO$.

Properties and Uses.—Stimulant, antiseptic, and demulcent. Used in prurigo, psoriasis, impetigo, lichen, lepra, pityriasis, herpes exedens, and some syphilitic and strumous eruptions. It may be added to poultices and lotions in a proportion varying from one-fourth to one-sixteenth. It acts as an emollient and soothing application, absorbing moisture from the air, and preventing the parts to which it is applied from becoming too dry. One-sixteenth of a grain, added to a few grains of borax and

rose-water, furnishes one of the most elegant and efficacious washes for chapped hands, face, lips, or nipples. Pills and extracts, incorporated with a small proportion of glycerin, are preserved soft and free from moldiness. It has been highly recommended for deafness, in which there is a partial or total absence of ceruminous secretion, by protecting the tympanum, and gradually restoring the parts to their natural condition; it is likewise said to cause hearing in cases where the tympanum is thickened and indurated, or where it is in a sound state or destroyed by ulceration, but in this last case it is not permanent; and when there is a hardness of the cerumen, and induration of the tympanum, it has proved very successful, in several cases treated by Prof. R. S. Newton, and other practitioners. The plan is to moisten wool with the glycerin, pure or diluted with water, and pass it into the ear. The bland and unirritating character of pure glycerin, its permanence, when exposed to the atmosphere, and the completeness with which it shields the parts covered by it, render it susceptible of many important applications. Mr. J. H. Ecky has given a formula for the preparation of a glycerin ointment, especially useful for chapped hands, lips, excoriations of the skin, etc. It will also serve as a medium for applying powders, etc. to ulcers, cutaneous affections, or other difficulties, by combining them with it, in the desired proportions. The formula is as follows: Melt together spermaceti half an ounce, and white wax one drachm, with oil of almonds two fluidounces, at a moderate heat; put these into a Wedgewood mortar, add glycerin one fluidounce, and rub together until well mixed and cold.

Dr. Goddard has given a formula for a very adhesive glycerin paste, suitable for fixing paper labels to glass and other surfaces, and which keeps well; it is to dissolve an ounce of gum arabic in two fluidounces of boiling water, add two fluidrachms of glycerin, and strain if necessary. This forms a valuable paste for druggists, chemists and others.

GLYCYRRHIZA GLABRA.

Liquorice.

Nat. Ord.—Fabaceæ, or Leguminosæ. *Sex. Syst.*—Diadelphia Decandria.

THE ROOT.

Description.—The liquorice plant has a perennial, cylindrical *root*, running to a considerable length and depth, grayish-brown externally, yellow internally, succulent, tough, pliable, rapid in its growth, and furnished with scattered fibers. The *stems* are erect, herbaceous, smooth, striated, with few branches, of a dull, glaucous-gray color, and growing two or three feet in height. The *leaves* are alternate, unequally pinnate; the *leaflets* are generally about thirteen, one terminal, ovate, somewhat retuse, petiolate, of a yellowish-green color, and viscid on their under surface; *stipules* inconspicuous. The *flowers* are small, bluish or purplish, and

are arranged in axillary, erect spikes, shorter than the leaves, and supported on long peduncles. The calyx is persistent, tubular, bilabiate, and five-toothed. The *corolla* consists of an ovate, lanceolate, obtuse, erect vexillum, two oblong alæ, and a two-parted, straight carina. The *stamens* are diadelphous; the *anthers* simple and rounded. The *ovary* is short, with a subulate style and blunt stigma. The *legumes* are oblong, smooth, compressed, acute, and one-celled, containing two or three small, reniform seeds.

History.—This plant is a native of the south of Europe and Asia, and is cultivated in England, France, and Germany. The root is imported chiefly from Messina and Palermo in Sicily, and some considerable from Spain. The root is the officinal part; when dry it is in long pieces, varying in thickness from a few lines to more than an inch, wrinkled longitudinally, grayish-brown on the surface, so dense as to sink in water, yellow, fibrous, and tough in its substance, without odor, and of a strong, peculiar, sweet, mucilaginous taste, and sometimes with a slight degree of acrimony. Its powder is brownish-yellow, or pale-yellow, if made of decorticated root. It must be kept in a dry place, or it will spoil. Its active part is soluble both in water, and in alcohol. A concentrated watery solution is acidulous. The best pieces are those not decayed or worm-eaten, with an internal bright-yellow color, and distinct layers. Analysis has found in it, *Glycyrrhizin* or *Glycion*; agedoïte, a crystallizable principle identical with asparagin; starch; albumen; a brown acrid resin; a brown azotized extractive matter; lignin; salts of lime and magnesia, with phosphoric, sulphuric and malic acids.

Glycyrrhizin may be obtained by subjecting a strong cold infusion of the root to ebullition, in order to separate the albumen; then filtering, precipitating with acetic acid, and washing the precipitate with cold water to remove any adhering acid. By solution in alcohol, and evaporation by a very gentle heat, it may be still further purified. It is a peculiar, transparent, yellow substance, of a sweet taste, hardly soluble in cold water, very soluble in boiling water, but forming a jelly with it on cooling, precipitated from its aqueous solution by acids, readily soluble in cold alcohol, does not undergo vinous fermentation, yields no oxalic acid by the action of the nitric, and is, therefore, distinct from sugar. In combination with the alkalies it retains its sweetness. Carbon, hydrogen, and oxygen are its elementary constituents.

An extract of sugar of liquorice, (*Extractum Glycyrrhizæ*), comes from Spain, Italy, and Sicily, in the form of hard, black cylinders, which is prepared by inspissating the decoction in copper kettles, till the mass is thick enough to become firm on cooling. The finest kind comes from Italy, and is stamped with the maker's name, "Solazzi." Water slowly dissolves from three-fifths to eleven-twelfths of it, alcohol only about one-eighth, and acquires an acrid taste, while the residuum is purely sweet, and entirely soluble in water.

The crude extract of liquorice is in cylindrical rolls, somewhat flattened, about five or six inches in length, by an inch in diameter, and often covered with bay leaves. The best kind is very black, dry, brittle, having a shining fracture; and a peculiar, sweet taste, and is nearly completely soluble in water. It frequently contains impurities, and should be purified previous to internal administration. A good extract, but less hard and brittle than the foreign, and more soluble in water, is prepared in New York.

To purify liquorice, the crude extract is dissolved in water without boiling, the solution strained, and evaporated to the proper consistence. Sometimes gum, glue, or starch is added during the process. Before the extract becomes perfectly dried it is rolled into long cylindrical pieces about the thickness of a pipe-stem, and is called *Refined Liquorice*. If the water be boiled during the purification, much of the impurity may be taken up, as well as the acrid oleo-resinous substance of the liquorice, which is not desirable.

The *Glycyrrhiza Lepidota*, which grows in Missouri, possesses the taste of liquorice to a considerable degree.

Properties and Uses.—Liquorice is a demulcent and expectorant, and is very useful in catarrhal affections, cough, and irritations of mucous membranes, allaying irritation of the urinary organs, and the pain in diarrhea. The decoction is the best form of administration, which may be given alone, or in combination with other agents. Before being used, it should always be deprived of its acrid bark. Long boiling extracts the acrid resinous principle; hence, in making a decoction, for the purpose of sweetening diet-drinks, or covering the taste of nauseous drugs, it should be boiled for only a few minutes. Probably, upon this acrid principle depends its virtues in chronic bronchial affections. The powdered root is also employed to give due solidity to pills, and to prevent their adhesion to each other; the extract, for imparting the proper viscosity to them. The extract held in the mouth, and allowed slowly to dissolve, is very useful in allaying cough. An excellent troche or lozenge very useful in ordinary cough, may be made by combining together, six parts of refined liquorice, two parts of benzoic acid, four parts of pulverized alum, and half a part of pulverized opium. Dissolve the liquorice in water, and evaporate to the proper consistence, then add the powders with a few drops of oil of anise, and divide into three or six grain lozenges.

Off. Prep.—Confectio Sennæ; Decoctum Glycyrrhizæ; Extractum Glycyrrhizæ; Tinctura Aloës.

GNAPHALIUM POLYCEPHALUM.

White Balsam.

Nat. Ord.—Asteraceæ. Sex. Syst.—Syngenesia Superflua.

THE HERB.

Description.—This plant, also known by the various names of *Indian Posy*, *Sweet-scented Life Everlasting*, *Old Field Balsam*, etc., is indigenous, herbaceous, and annual, with an erect, whitish, woolly, and much branched *stem*, from one to two feet in height. The *leaves* are alternate, sessile, linear-lanceolate, acute, entire, scabrous above, and whitish tomentose beneath. The *flowers* are tubular and yellow; in *heads* clustered at the summit of the paniced-corymbose branches, ovate-conical before expansion, then obovate. *Involucre* imbricate, with whitish, ovate and oblong, rather obtuse scales. *Florets of the ray*, subulate,—*of the disk*, entire. *Receptacle* flat, naked; *pappus* pilose, scabrous, capillary.

History.—White Balsam is found in Canada, and various parts of the United States, growing in old fields, and on dry, barren lands, and bearing whitish-yellow flowers in July and August. The leaves have a pleasant, aromatic smell, and an aromatic, slightly bitter and astringent, but rather agreeable taste. They yield their properties to water. No analysis has been made of them. The *Antennaria Margaritacea*, formerly *Gnaphalium Margaritacea*, or Pearl-flowered Life Everlasting, a perennial plant, possesses similar properties to the above.

Properties and Uses.—Astringent. The leaves and blossoms chewed, and the juice swallowed, has proved beneficial in ulcerations of the mouth and throat. A warm infusion may be used in fevers to produce diaphoresis, and is of service in quinsy, pulmonary complaints, leucorrhœa, etc.; it may be used internally and as a local application. Likewise used in infusion, in diseases of the bowels, and hemorrhages, and applied in fomentation to bruises, indolent tumors, and other local complaints. The fresh juice is reputed anti-aphrodisiac.

Off. Prep.—Infusum Gnaphalii.

GOODYERA PUBESCENS.

Net-leaf Plantain.

Nat. Ord.—Orchidaceæ. Sex. Syst.—Gynandria Monandria.

THE LEAVES.

Description.—This plant, likewise known by the names of *Scrofula-weed*, *Adder's Violet*, *Rattlesnake-leaf*, etc., has a perennial *root*, from which arises an erect, sheathed and pubescent *scape*, from eight to twelve inches in height. The *leaves* are radical, ovate, dark-green, conspicuously reticulated and blotched above with white, about two inches in

length, and contracted at base into winged petioles scarcely half as long. The *flowers* are white, numerous, pubescent, in a crowded, terminal, oblong, cylindric *spike*. *Lip* ovate, acuminate, saccate, inflated. *Petals* ovate. The *Goodyera Repens* is a reduced variety of the above, the *scape* being from six to eight feet in high, the *leaves* less conspicuously reticulated, and the *flowers* being on a somewhat unilateral spike, more or less spiral; in other respects about the same as the preceding.

History.—This herb grows in various parts of the United States, in rich woods, and under evergreens, and is common southward, while the *G. Repens* is more common northward and on mountains. It bears white, or yellowish-white flowers in July and August. The leaves are the parts employed, and yield their virtues to boiling water. No analysis has been made of them.

Properties and Uses.—Net-leaf Plantain is antiscrofulous, and is reputed to have cured severe cases of scrofula. The fresh leaves are steeped in milk and applied to scrofulous ulcers as a poultice, or the bruised leaves may be laid on them, and in either case, they must be renewed every three hours; at the same time a warm infusion must be taken as freely as the stomach will allow. Used as an injection into the vagina, and at the same time exhibited internally, the infusion has proved beneficial in leucorrhœa, recent prolapsus uteri, and as a wash in scrofulous ophthalmia.

Off. Prep.—Infusum Goodyeræ.

GOSSYPIUM HERBACEUM.

Cotton.

Nat. Ord.—Malvaceæ. *Sex. Syst.*—Monadelphia Polyandria.

THE FILAMENTOUS MATTER SURROUNDING THE SEEDS, AND INNER BARK OF THE ROOT.

Description.—*G. Herbaceum* is an annual, herbaceous plant, with a round, upright, pubescent *stem*, from three to five feet high, brown at the lower part, with straight fissures, spotted with black at the top, and with spreading branches. The *leaves* are five-lobed, palmate, hoary, with a single gland below, on the midvein at the back, half an inch from the base; *lobes* mucronate, somewhat lanceolate and acute. The *flowers* are pretty and yellow; the *corolla* consists of five spreading petals, united below into a tube, of a pale-yellow color, with a red or purple spot on each at the base, deciduous; the *calyx* is cup-shaped, obtusely five-toothed, and surrounded by a three-leaved involucre, the leaflets of which are much cut and dentate. The *capsule* is bluntly three-cornered, three-valved, three-celled, opening when ripe and displaying a loose white tuft of long slender filaments, or cotton. *Seeds* three in each cell,

immersed in cotton, clothed with a dense, close, short tomentum, white, convex on one side, and somewhat flattened on the other. *GOSSYPIUM BARBADENSE* or Sea Island Cotton Plant, is a larger plant than the preceding; the *leaves* are five-lobed with three glands beneath, upper ones three-lobed; cotton white, and seeds black. It is likewise biennial or triennial.

History.—The Cotton Plant is a native of Asia, but is extensively cultivated in the warmer climates of the old and new continents. Cultivation has much changed the plant, so as to render it very difficult to determine which are distinct species and which the varieties. Authors have described from six to thirteen species, which Swartz and Macfadyen believe to be mere varieties of one species; while Hamilton, Wight and Arnott, are of opinion that there are but two distinct species, the *G. Album* with white seeds, and the *G. Nigrum* with black seeds; the others being varieties caused by cultivation. There is considerable difference in the various cotton plants, as regards the glands, the color of the flowers, the shape of the leaves, the height of the bush, as well as the length and fineness of the cotton. The plant cannot be cultivated for practical purposes in this country, north of Virginia. The leaves contain much mucilage and have been used as a demulcent, and the seeds yield by expression a drying fixed oil, which has been occasionally employed. But the officinal part is the inner bark of the root, and the hairs or filamentous substance attached to the seeds, which when separated from them forms cotton. Under the microscope these filaments appear to be flattened tubes, with occasional joints, indicated by transverse lines. Cotton is without smell or taste, insoluble in water, alcohol, ether, oils, vegetable acids, soluble in strong alkaline solutions, and decomposed by the concentrated mineral acids. Gun-cotton is made from it by the action of nitric acid, from which collodion is prepared. For medical use it should be carded into thin sheets. Cotton has not been analyzed.

Properties and Uses.—The bark of the root of the cotton plant is emmenagogue, parturient and abortive. It is said to promote uterine contraction with as much efficiency and more safety than ergot; and is used by the slaves of the south for producing abortion, which it does without any apparent injury to the general health. Four ounces of the inner bark of the root is boiled in a quart of water down to a pint, the dose of which is one or two fluidounces every twenty or thirty minutes. The hydro-alcoholic extract forms an excellent emmenagogue, and may be used in chlorosis, amenorrhea, dysmenorrhea, etc.

The *seeds* are reputed to possess superior antiperiodic properties. A pint of cotton seed placed in a quart of water, and boiled down to one pint, and one gill of the warm tea given an hour or two before the expected chill, is said to cure intermittent fever with the first dose. The flowers and leaves are reputed diuretic, and useful in urinary affections;

the leaves steeped in vinegar, are said to relieve hemicrania when locally applied, and a decoction is considered beneficial in the bites of venomous reptiles, in Brazil. Externally, cotton is employed in the treatment of recent burns and scalds, in erysipelas, as a dressing for blisters, wounds, severe bruises or contusions, and in rheumatic pains. In burns and blisters care must be taken that it does not become a mechanical-irritant, in consequence of its becoming consolidated over the surface to which it is applied, and which may be avoided by first applying some simple ointment over the surface which is to come in contact with the ulcer, or burn. It probably produces its beneficial results, by absorbing the fluids effused, and protecting the parts over which it is placed from the action of the air.

Off. Prep.—Decoctum Gossypii Radicis ; Decoctum Gossypii Seminis ; Extractum Gossypii.

GUAIAECUM OFFICINALE.

Guaiacum.

Nat. Ord.—Zygophyllaceæ. *Sex. Syst.*—Decandria Monogynia.

THE WOOD AND RESIN.

Description.—This is a tree of very slow growth, attaining the height of from fifty to sixty feet, with a trunk from three to six feet in circumference. The *stem* is generally crooked, with numerous, divaricate, knotty, short-jointed, flexuose *branches* ; its bark is smooth, but furrowed, of a dark-gray color, variegated with greenish or purplish spots ; that of the branches is ash-colored and striated. The *wood* is hard and ponderous, with a dark olive-brown center, but whitish toward the bark, and has a peculiar odor. The *leaves* are opposite, abruptly-pinnate, consisting of two, three, and sometimes four pairs of elliptical, entire, veined, smooth, rigid, shining, dark-green, and sub-sessile *leaflets*, which are from an inch to an inch and a half in length ; the *common petiole* is terete, and channeled above. The *flowers* are pale-blue, on long, simple, axillary, filiform, minutely downy *peduncles*, about an inch in length. The *calyx* consists of five ovate, obtuse, concave, hoary, deciduous *sepals*, the two outer of which are somewhat broader than the others. The *petals* are five, light-blue, roundish, obovate, thrice the length of the sepals, internally downy, with short linear claws inserted into the receptacle. The *stamens* are ten, awl-shaped, erect, shorter than the petals, grooved on the back, with oblong, curved *anthers*, bifid at the base. The *ovary* is two-celled, compressed, with numerous suspended ovules, and a short awl-shaped *style*. The *capsule* is obovate, succulent, glabrous, yellow, with from two to five rounded angles, and as many cells opening at these angles ; two or three of these cells are often abortive. The *seeds* are solitary, compressed, convex on one side, angular on the other, pendulous, with a cartilaginous albumen, and a straight, green embryo.

History.—This is a tree growing in the West Indies, particularly in Hayti and Jamaica. All parts of it are possessed of medicinal properties, but the wood and the concrete juice only are official. The bark is said to be the most efficient part of the tree, but it is not met with in commerce. The wood of this tree had been used as a medicine by the natives previous to the discovery of the country, and who made it known to the Europeans; by these it was introduced into Europe in the sixteenth century, and employed with much advantage in syphilitic affections. Guaiacum wood, commonly called *lignum vite*, from a supposition that it possessed superior medicinal virtues, is largely imported into this country from the West India Islands, for the purpose of making block-sheaves, and various other instruments, for which its density and extreme hardness render it especially adapted. It comes in billets about a foot in diameter, covered with a thick gray bark, which presents on its inner surface as well as on its fractured edges, numerous shining, crystalline points; more generally, however, the bark is absent. The wood, as used in medicine, consists of turnings from the workshop of the turner, and is a uniform mixture of the alburnum and duramen.

The alburnum or sap-wood is of a yellow color, that of the duramen or heart-wood, greenish-brown, and which are mixed in about equal proportion in the shavings. Guaiacum wood is inodorous, unless rubbed or heated, when it becomes odorous; giving an agreeable scent when burned. It has an acrid, bitterish, and aromatic taste, attended with a singular pricking in the throat, and which is excited most strongly by the alburnum. It is very dense, hard and tough, of sp. gr. 1333, sinking in water. When rasped, it emits a peculiar fragrance and excites sneezing. In a state of minute division, exposure to the air turns it green; nitric acid turns it bluish-green, as does also a solution of corrosive sublimate; this last should be applied to the shavings, and slightly heated. These tests may be employed to determine the genuineness of the wood. Boiling water and alcohol take up its active parts—the alcohol dissolving 21 per cent., the water 14. It has not been satisfactorily analyzed, but contains a bitter, pungent extractive, resin, and benzoic acid. One pound of the wood afforded to Geiger two ounces of extract. This extract treated with ether, the ethereal tincture evaporated and the residue carefully sublimed, affords a volatilizable acid, which condenses in small, brilliant needles, called *guaiacic acid*; if the heat be pushed too far, an oil is produced which colors the crystals. Jahn considers this substance to be benzoic acid, with volatile oil and resin. It is stated that the guaiacum wood is also obtained from other species, especially the *G. Sanctum*, and *G. Arboreum*. The former is semi-transparent, paler-yellow, and less heavy and hard, but probably, as fit for medical use as the officinal wood.

Properties and Uses.—Guaiacum wood is stimulant, diaphoretic, alterative, and diuretic. If the body be kept warm while using the decoction,

which is the form generally preferred, it will prove diaphoretic; if cool, diuretic. As a diaphoretic and alterative, it has been administered (but usually in compound decoction or syrup), in chronic rheumatism, chronic cutaneous diseases, scrofula, and syphilitic diseases. As water cannot take up much of the active principle in the wood, it is probable that its reputed efficacy was owing principally to the active agents associated with the syrup or decoction. The resin of guaiacum is the active principle, which see. The decoction of guaiacum shavings may be made by boiling an ounce in a pint and a half of water down to a pint, the dose of which is from two to four fluidounces every three or four hours.

Off. Prep.—Decoctum Guaiaci; Syrupus Sarsaparillæ Compositus.

GUAIACI RESINA.

Guaiac.

THE CONCRETE JUICE OF GUAIACUM OFFICINALE.

History.—The resin of Guaiacum, or *gum guaiacum* as it is erroneously called by some, is obtained from the wood of the tree, in several different modes; by spontaneous exudation, by incisions made into the tree, or by boiling the chips or sawdust from the wood in a solution of common salt, and skimming off the substance which floats to the surface. This last is the method most commonly pursued. Guaiac is imported from the West Indies in irregular lumps of various sizes, combined with more or less impurities, as bark, sand, earthy matters, etc. Its surface is brownish-red, or brownish-yellow when recent, but becomes greenish-brown under exposure to the air. It is brittle, presenting a splintery vitreous fracture with some translucency. Its odor is feeble but fragrant, and is increased by heat. Its taste, at first scarcely perceptible, is faintly bitter, and sweetish, succeeded by a permanent sense of heat and pungency in the mouth and fauces. It pulverizes readily, and the powder, at first of a light-gray color, becomes greenish on exposure to the light, and in the air it becomes somewhat tenacious, quickly aggregating. A very moderate heat melts it. Alcohol dissolves it readily, forming a dark reddish-brown fluid, from which the guaiac is precipitated by water, by sulphuric or muriatic acid. Ammoniated alcohol, or solutions of the fixed alkalis dissolve it. Ether does not readily dissolve it; fixed and volatile oils scarcely at all. Water dissolves about nine parts in one hundred of the resin, becoming colored greenish-brown and having a sweet taste; and upon evaporating the water from the infusion a brown substance is obtained which is soluble in hot water or alcohol, but hardly at all in ether. Sulphuric acid forms with guaiac a deep-red solution; nitric acid converts it into oxalic acid and an extractive matter, without producing any artificial tannin. Its specific gravity varies from 1.2 to 1.23. Analysis has found in it resin and a trace of benzoic acid.

Guaiac is subject to adulteration with pine resin, and other substances; this may be detected by observing, that the genuine article when freshly fractured is green, not red; that the tincture of the spurious article will not render the recently-cut surface of a potato, carrot, or other plants containing gluten or milk, mucilage of gum Arabic, etc., blue—which change will be effected by the tincture of the genuine guaiac; that when heated, guaiac does not exhale a turpentine odor; that oil of turpentine dissolves resin, but not guaiac; and that paper which has been moistened by the tincture of guaiac, speedily becomes blue on exposure to the vapors of nitric acid. The mineral acids are *incompatible* with the solutions of guaiac.

The pure resinoid principle of guaiac, obtained by ether from the resin, by a process similar to that named in the preceding article for procuring it from the wood, is named *Guaiacin*. It is readily soluble in alcohol, less so in ether, and insoluble in water. It forms soluble compounds with the alkalis, which are decomposed by mineral acids, and several salts, on which account it has been termed *Guaiacic acid*. The resin of guaiac, according to Jahn, consists of three distinct resins, one soft, and soluble in ether or ammonia, and forming 18.7 per cent. of the crude drug; another, likewise soft, soluble in ether, but scarcely in ammonia, constituting 58.3 per cent.; and the third, hard, soluble in ammonia but not in ether, amounting to 11.3 per cent.

Properties and Uses.—Guaiac is stimulant and alterative. Soon after being swallowed it produces a sense of warmth in the stomach, which is followed by slight increase of the pulse and temperature, dryness of the mouth, thirst, and diaphoresis or diuresis, depending upon the temperature at which the body is kept during its exhibition. Large doses act as a cathartic. It is used in the same affections as the Guaiaci Lignum, or guaiacum wood. Several practitioners have found it beneficial in amenorrhea, dysmenorrhea, and other uterine diseases; likewise in acute dysentery, in which its employment is said to be followed by speedy beneficial results. It is much used in chronic rheumatism, and in the declining stages of the acute form, and has proved a most valuable agent in these diseases. It is said to be an antidote to the effects of the tincture of *Rhus Toxicodendron*. If the preparations of guaiacum produce sickness, defective appetite, and irregularity of the bowels, their use must be discontinued. Dose of the powdered resin, from five to twenty grains; of the tincture, from one to four fluidrachms, either of which may be repeated three or four times a day. A mixture of ten grains each of guaiac and compound powder of ipecacuanha and opium, has been found of advantage in rheumatism and dysentery.

Off. Prep.—Tinctura Guaiaci; Tinctura Guaiaci Aromatica; Tinctura Guaiaci Ammoniata.

GUNPOWDER.

(Pulvis Pyrius. Pulvis Nitratus.)

History.—Gunpowder is prepared by combining together, five or six parts of nitre, with one part each, of charcoal and sulphur; however, these proportions vary with the different manufacturers of the article, so that there is no regular or officinal method for its preparation. The uses of gunpowder, aside from medicine, are too well known to require any description.

Properties and Uses.—Recommended as a detergent and alterative in chlorosis, and dyspepsia, also as a corrective of morbid secretions of the gastro-mucous membrane, dependent on, or accompanied with subacute inflammation. Dose, ten grains, three or four times a day, gradually increased, occasionally using a mild laxative. Externally, applied in powder or ointment to indolent ulcers, and several forms of cutaneous diseases. Gunpowder dissolved in water, and the solution taken in teaspoonful doses three or four times in twenty-four hours, and continued daily, has cured gonorrhea. Dr. Bone and Dr. Henry, two celebrated botanic practitioners of some thirty or forty years since, made considerable use of this article in the treatment of some forms of cutaneous disease, indolent ulcers, and even cancers; the following is the formula they employed; simmer one pound of the inspissated juice of poke for a short time, on hot ashes, until the aqueous portion has evaporated; then place it in an iron dish, add to it a pound of fresh butter, and half a pint of finely pulverized gunpowder, and place it over a fire, where it must be kept until it is so far dried that the mixture will flash once or twice; or if it should take fire instead, it must be immediately smothered. Remove it into a glazed pipkin, and let it remain on hot ashes until it is well incorporated, when it may be transferred into pots, and covered with alcohol to prevent it from molding. This ointment applied twice a day, is reputed to destroy cancer to its extreme fibers or roots.

Off. Prep.—Lotio Hydrastii Composita.

GUTTA PERCHA.

Gutta Percha.

Nat. Ord.—Sapotaceæ *Sex. Syst.*—Decandria Monogynia.

CONCRETE JUICE OF ISONANDRA GUTTA.

Description.—This is the product or milky juice of a large tree growing in Singapore and its vicinity, the Isonandra Gutta. The tree is very large, having a trunk from three to six feet in diameter, with numerous ascending branches, the extremities of which are crowded with petiolate, oblong leaves, green above, brownish beneath, and four or five inches long by two in width. The flowers are small and white.

History.—This substance was introduced in 1842, to the profession, by Dr. William Montgomerie, a surgeon in the British army in the Indies. The mode pursued by the natives in collecting it, is to cut down the tree, strip off the bark, and then collect the milky juice in suitable vessels, which coagulates on exposure to the air. This he considers a wasteful course, as each tree yields only twenty or thirty pounds of the concrete juice, and probably a larger yield might be had by tapping the trees, and thus preserving them for future use. As received in this country it is rendered impure by the admixture of various foreign matters, from which it may be freed by kneading in hot water, or by melting it with oil of turpentine, straining, and evaporating the oil. Gutta percha is of a dull white, or whitish color, of a feeble odor, tasteless, at ordinary temperatures hard, almost horny, somewhat flexible in thin pieces, having an unctuous feel under the fingers, and very tenacious. It is softened by hot water or dry heat, and on cooling resumes its former state, and retains any form which may have been given to it. At 150° or 160°, it is soft, very plastic, and capable of being welded and molded into any form. When soft, it may be cut with a knife. Its specific gravity is 0.9791. It is insoluble in water, alcohol, alkaline solutions, and the weak acids. Ether and the volatile oils soften it in the cold, and imperfectly dissolve it with the aid of heat. Oil of turpentine dissolves it perfectly, forming a clear, colorless solution, which yields it unchanged by evaporation. Bisulphuret of carbon also dissolves it without change. It resembles caoutchouc and is a non-conductor of electricity. It is used for a number of useful and ornamental purposes. In the dissolved state it is used as a varnish impervious to moisture. Chloroform and benzole dissolve it. Pure gutta percha is analogous, in its ultimate composition, with caoutchouc; the ordinary article of commerce contains pure gutta percha, a small quantity of a vegetable acid, casein, a resin soluble in ether or oil of turpentine, and a resin soluble in alcohol. It may be vulcanized in the same manner as caoutchouc, and undergoes a similar change of properties.

Properties and Uses.—Used in surgery, as bands and splints, to preserve limbs and joints in fixed positions, also for the formation of bougies, injection pipes, catheters, pessaries, artificial teats, forceps-handles, etc. The solution in bisulphuret of carbon is recommended as an application to the skin in incised wounds—the liquid speedily evaporates, while the gutta hardens, and holds the edges of the wound firmly together. The following compound is recommended for the hemorrhage supervening the extraction of teeth. Take of gutta percha an ounce; best tar an ounce and a half; creosote a drachm; shell lac an ounce. Boil these in a crucible, stirring or beating them well, until they are blended into a stiff, homogeneous mass. The compound is readily softened between the fingers, and is easily introduced into the bleeding socket. It must be pressed in, and the hemorrhage will be speedily

checked. Mr. Acton states that the following preparation is useful for protecting exposed surfaces from contagions, poisonous contact, etc.; dissolve with a gentle heat one drachm of gutta percha in an ounce of benzole; also half a scruple of caoutchouc in an ounce of benzole, and mix the two solutions. Apply it with a brush, the liquid evaporates leaving a delicate covering behind. An improved cement for uniting the parts of boots and shoes, and in the manufacture of articles of dress in which cement is required, is made of 64 parts by weight of gutta percha, 16 parts of caoutchouc, 8 parts of pitch, 4 parts of shell-lac, and 8 parts of oil; the ingredients are melted together, the caoutchouc having been previously dissolved. A cement for uniting sheet gutta percha to silk or other fabrics, is composed of gutta percha 40 lbs., caoutchouc 3 lbs., shell-lac 3 lbs., Canada Balsam 14 lbs., Liquid styrax 35 lbs., gum mastic 4 lbs., and oxide of lead 1 lb. Another for uniting it to leather, as soles of shoes, etc., consists of:—Gutta percha 50 lbs., Venice turpentine 40 lbs., shell-lac 4 lbs., caoutchouc 1 lb., and liquid styrax 5 lbs.

HÆMATOXYLON CAMPECHIANUM.

Logwood.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Decandria Monogynia.

THE WOOD.

Description.—This is a tree of from twenty to twenty-five feet in height, and occasionally reaching forty or fifty feet. The *trunk* or *stem* is generally crooked and deformed, seldom exceeding a foot and a half in diameter and covered with a rough, ash-colored bark. The *branches* are somewhat flexuose, terete, covered with whitish spots; in mountains and moist situations they are unarmed, but in localities where the tree is stunted in growth, they are furnished with sharp spines below the leaves. The *leaves* are alternate, abruptly pinnate, and are composed of three or four pairs of subsessile, obovate or obcordate, obliquely-nerved leaflets. The *flowers* are yellow, slightly fragrant, on pedicels half an inch in length, and collected in axillary and subterminal racemes. The *calyx* is deeply five-parted, brownish-purple, with thin, membranous, deciduous, unequal lobes, and a short, green, campanulate tube. The *petals* are nearly equal, obovate, wedge-shaped at base, scarcely longer than the sepals, and of a lemon-yellowish color. The *stamens* are ten, alternately short, inserted on the inside of the margin of the persistent tube of the calyx; *filaments* hairy at base; anthers ovate, and without glands. The *ovary* is lanceolate, compressed, three-seeded, bearing a capillary style which projects beyond the stamens and petals; *stigma* capitate, expanded. The *pod* or *legume* is flat, compressed, lanceolate, acuminate at both ends, one-celled, two-seeded, not opening at

the sutures, but bursting in the middle longitudinally. The *seeds* are transversely oblong.

History.—This tree is a native of Campeachy and other parts of tropical America, and has become naturalized in many of the West India islands. The wood consists of a yellowish alburnum, and a dingy cherry-red inner wood, which last is the part used in medicine and the arts; it forms a valuable article of commerce, and is extensively used in dyeing. It is imported in heavy, hard, close-grained billets, which are cut into chips, or rasped into a coarse powder for general use. It becomes darker-colored by exposure, has a sweetish, somewhat astringent, and peculiar taste, and a slight, rather pleasant odor. Water or alcohol extracts its coloring matter, forming deep-purple solutions. Its aqueous solution yields a fine blue precipitate with lime-water, alum, acetate of lead, a deep violet blue with the salts of sesquioxide of iron, and curdy flakes with solution of gelatin; sulphuric, nitric, muriatic and acetic acids, and sulphate of copper also produce precipitates. Water is the menstruum usually employed to extract its virtues. A pound of the wood yields about two ounces of extract. It has been analyzed several times, and is found to contain volatile oil, an oleaginous or resinous matter, a brown substance the solution of which is precipitated by gelatin, another brown substance soluble in alcohol, but not in ether or water, an azotized substance resembling gluten, free acetic acid, various salts, and a peculiar principle called *Hematin* or *Hematoxylin*, which is sometimes found crystallized in the crevices of the wood. It may be obtained by digesting the dry commercial watery extract with alcohol, evaporating the tincture till a thick, syrupy fluid is obtained, then adding a little water, and submitting the liquid again to a gentle evaporation. Crystals form in a few days upon standing, and more are deposited as the fluid evaporates spontaneously. These may be purified by washing with alcohol and drying. When first obtained they are of a yellow-rose color, shining, bitterish, acrid, and slightly astringent, readily soluble in boiling water, forming an orange-red solution which becomes yellow on cooling, and soluble also in alcohol or ether. If ether be used in the process instead of alcohol, and the purifying be accomplished by washing the crystals with water, they are obtained of a pale-straw color, becoming reddish-yellow by exposure to air containing the least trace of ammonia, or even in close vessels, to bright sunlight. They are sweet like liquorice, without either bitterness or astringency; and though not a coloring substance of themselves, yet they afford beautiful red, blue, and purple colors when acted upon by an alkaline base and the oxygen of the air. Their constitution is $C_{20} H_{17} O_{15}$.

Properties and Uses.—Logwood is tonic and astringent, without any irritating properties. It may be used with much advantage in diarrhea, dysentery, and the relaxed condition of the bowels succeeding cholera-

infantum. A favorite preparation with many practitioners in cholera-infantum, after a proper employment of the Syrup of Rhubarb and Potassa, is the following: Dissolve two drachms of extract of logwood in four fluidounces of boiling water, to this solution add two fluidrachms of ammoniated tincture of opium, three fluidrachms of tincture of catechu, one fluidrachm of compound spirits of lavender, and four fluidounces of simple syrup, or syrup of ginger. The dose is a teaspoonful every three or four hours. In constitutions broken down by disease, dissipation, or the excessive use of mercury, the decoction of logwood, used freely in connection with the other treatment, will be found highly beneficial. Dose of the decoction from two to four fluidounces; of the extract, five to thirty grains. The use of logwood imparts a blood-red color to the stools and the urine. It should never be combined with chalk or lime-water, as they are *incompatibles*.

A good red ink may be made as follows: Take of Pernambuco wood, a Brazilian wood said to be derived from *Cæsalpina Echinata*, four ounces, dilute acetic acid, distilled water, of each sixteen ounces; boil together, until twenty-four ounces remain. Then add an ounce of alum, evaporate the liquid to sixteen ounces, dissolve an ounce of gum arabic in it, strain, and to the cold liquid add a drachm of protochloride of tin. This ink is preferable to the cochineal ink, being free from its bluish tint, and more permanent.

Off. Prep.—Decoctum Hæmatoxyli; Extractum Hæmatoxyli; Vinum Hæmatoxyli Compositum.

HÆMOSPASIS.

Hæmospastic Medication. Dry Cupping.

This is a powerful revulsive treatment. Anything which draws the blood to a part may be said to act hæmospastically. Dry cupping does so; it not only draws the blood from internal parts to the surface, but likewise attracts morbid action, and thus affords relief. Common half-pint tumblers will answer for adults very well, in place of ordinary cupping-glasses. A piece of paper or cotton, rolled up and fired, and dropped into the tumbler, and allowed to burn a minute or two, fits the tumbler for application to the spot. One, two, or more may be applied, and repeated as often as may be desirable; they should remain until ready to fall off. Intermittent fever has been invariably cured by M. Condret, by applying eight or ten middle-sized cupping-glasses, on each side of the spinal column, from the neck downward, and allowing them to remain for about thirty or forty minutes. To be applied at the commencement of the cold stage. One to four applications effects the cure. Also useful in cases of difficult respiration from congestion of the lungs or mucous membrane of the bronchii, etc.

HÆMASTASIS is a term applied to the retention of venous blood in the extremities by ligature. Tie a handkerchief, or any suitable cord around the upper part of the arms, and the thighs, and then, by means of a piece of wood, twist or turn the cord sufficiently tight to check the circulation of the venous blood, but not the arterial, which may be known by the action of the pulse. In a short time the arms and legs will be much distended, and an amount of blood removed from the trunk and retained in the limbs, which the most heroic practitioner dare not remove by the lancet. If the subject faint, promptly loosen or remove the ligatures; if he be plethoric and of firm, vigorous constitution, he must be reduced by cathartics, diuretics, sudorifics, and be under the influence of gentle nauseants, at the time of the operation. This is found very useful in uterine hemorrhage, hemoptysis, and other hemorrhages, inflammations of the brain, lungs, bowels, etc., congestions, puerperal convulsions, and wherever it is deemed advisable to lessen the amount of blood in the head and trunk, without injuring the system.

HAMAMELIS VIRGINICA.

Witch Hazel.

Nat. Ord.—Hamamelaceæ. *Sex. Syst.*—Tetrandria Virginica.

THE BARK AND LEAVES.

Description.—This is an indigenous shrub, sometimes called *Winter-bloom*, *Snapping-hazlenut*, *Spotted Alder*, etc.; it consists of several crooked, branching trunks from the same root, from four to six inches in diameter, ten or twelve feet in height, and covered with a smooth gray bark. The *leaves* are on short petioles, alternate, oval or obovate, acuminate, obliquely subcordate at base, margin crenate-dentate, scabrous with minute elevated spots beneath, from three to five inches long, and two-thirds as wide. The *flowers* are yellow, on short pedicels, three or four together in an involucre, axillary, subsessile glomerule. The *calyx* is small, and divided into four, thick, oval, pubescent segments, with an involucre of two or three bracts at base. *Petals* four, yellow, three-quarters of an inch long, linear, curled or twisted. *Stamens* four, fertile, alternate with the petals, and four, sterile at their base. *Ovary* ovate, with two short styles, crowned by obtuse stigmas. *Fruit* a nut-like capsule, bilobate and split above, yellowish, pubescent, with two cells, each containing an oblong, shining black seed, which seeds are dispersed by the elastic valves of the capsule opening rapidly.

History.—This plant grows in almost all sections of the United States, especially in damp woods, flowering from September to November, when the leaves are falling, and maturing its seeds the next summer. The bark and leaves are the parts used in medicine; they have a pleasant, aromatic odor, and a bitter, astringent taste, leaving a sense of pungency

and sweetishness in the mouth. Water extracts their virtues. No analysis has been made of them. The shoots are used as divining-rods to discover water and metals under ground, by certain adepts in the occult arts.

Properties and Uses.—Witch Hazel is tonic, astringent, and sedative. The decoction of the bark is very useful in hemoptysis, hematemesis, and other hemorrhages, as well as in diarrhea, dysentery, and excessive mucous discharges. It has been employed with advantage in incipient phthisis, in which it is supposed to unite anodyne influences with its others. Reputed to have been used by the Indians as a sedative and discutient in painful tumors, and external inflammations. The decoction may be advantageously used as a wash or injection for sore-mouth, painful tumors, external inflammations, bowel complaints, prolapsus ani and uteri, leucorrhea, gleet, and ophthalmia. An ointment made with lard and a decoction of white oak bark, apple-tree bark, and witch hazel, has been found a valuable application to piles. The following forms a useful preparation:—Take equal parts of witch hazel bark, golden seal, and lobelia leaves, the first two made into a strong decoction, after which add the lobelia to the hot liquid, and cover; when cold, strain. With this decoction as a collyrium, I have succeeded in curing the most obstinate and long standing cases of ophthalmia, as have many other practitioners to whom I have named it. Dose of decoction, from two to four fluidounces, three or four times a day.

Off. Prep.—Decoctum Hamamelis.

HEDEOMA PULEGIoidES.

Pennyroyal.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Diandria Monogynia.

THE HERB.

Description.—This is an indigenous annual plant, sometimes called *Tick-weed*, *Squaw-mint*, etc. The root is small, fibrous, branching, yellow, from which arises a pubescent stem from six to fifteen inches in height, upright, somewhat angular, with numerous, erect, slender branches. The leaves are opposite, small, lanceolate-oblong or ovate, narrowed at the base, margin remotely serrate, rough, pubescent and prominently veined on the under surface, smooth above, and on short petioles. The flowers are very small, of a pale-blue color, on short pedicels, and arranged in axillary whorls, along the whole length of the branches. The calyx is striated and pubescent, bilabiate, the upper lip divided into two ciliated segments, the lower into three rounded lobes. The stamens and style are filiform. The seeds are four, oblong, contained in the persistent calyx, the mouth of which is closed by bristles of the lower lip.

History.—This herb was placed by Linnæus in the genus *Melissa*, and afterward *Cunila*, from which it was separated by Persoon, and placed in the genus *Hedeoma*. It must not be confounded with the *Mentha Pulegium*, or *European Pennyroyal*. It is a well known plant, growing in dry, sterile situations, especially in calcareous soils, and blossoms from June to September and October, rendering the air fragrant for some distance around it. It is common to nearly all parts of the United States. It has a pleasant, aromatic smell, which, however, is very offensive to some persons, and a warm, pungent, mint-like taste. It imparts its virtues to boiling water by infusion; boiling destroys its activity by evaporating the volatile oil, on which its properties depend. The oil may be obtained by distillation with water, and is often employed, or its tincture, instead of the herb itself; it is of a light-yellow color, and specific gravity 0.948.

Properties and Uses.—Pennyroyal is a stimulant, diaphoretic, emmenagogue, and carminative. The warm infusion, used freely, will promote perspiration, restore suppressed lochia, and excite the menstrual discharge when recently checked; it is often used by females for this last purpose,—a large draught being taken at bed-time, the feet having been previously bathed in warm water. A gill of brewer's yeast added to the draught is reputed a safe and certain abortive. The warm infusion may likewise be employed with advantage in the flatulent colic of children. The oil, or its tincture, is also administered as a carminative, and anti-emetic, and has been of benefit in hysteria, whooping-cough, spasms, etc. It is likewise used as a rubefacient in rheumatism, and united with linseed oil, as an application to burns. Dose of the oil, from two to ten drops.

Off. Prep.—Decoctum Hedeomæ; Oleum Hedeomæ.

HERERA HELIX.

Ivy.

Nat. Ord.—Araliaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES AND BERRIES.

Description.—This is an evergreen creeper, with long and flexible stems and branches, which attach themselves to the earth, or trees, or walls, by numerous root-like fibers. The leaves are coriaceous, smooth, shining, dark-green, with white veins, petiolate, the lower ones five-angled or five-lobed, the upper or old ones ovate and acute. The flowers are greenish-white, and are disposed in numerous, simple and downy umbels, forming a corymb. The berries black, with a mealy pulp.

History.—This well known plant is a native of Europe, and is cultivated in many parts of the United States; it flowers in September. The

leaves and berries are the parts used. The *leaves* have a balsamic odor, especially when rubbed, and a bitter, astringent, and nauseous taste. The *berries* have an acidulous, resinous, somewhat pungent taste. A peculiar, very bitter, alkaline principle, named *Hederin* or *Hederia*, has been discovered in the ivy seeds by Vandamme and Chevallier, and which appears to be closely allied to quinia in febrifuge properties. It is obtained by treating the seeds with hydrate of lime, dissolving the precipitated alkali in boiling alcohol, and evaporating the alcoholic solution.

Properties and Uses.—The *leaves* have been employed for dressing issues, and, in the form of decoction, have been recommended as a wash in sanious ulcers, itch, tetter, and other cutaneous eruptions; likewise to destroy vermin in the hair, which latter, it is stated, is stained black by this application; reputed beneficial as a cataplasm, in chronic glandular enlargements. Dried and powdered, they have been employed in the atrophy of children, rachitis, and pulmonary complaints, in the dose of a scruple or more. The *berries* are purgative and emetic, and were at one time much esteemed in febrile affections. Boyle considered them to be sudorific, and in the great plague in London, they were administered in combination with vinegar.

HELENIUM AUTUMNALE.

Sneezewort.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE HERB.

Description.—This plant, likewise called *Swamp*, or *False Sunflower*, has a perennial fibrous root, with several angular branching, minutely pubescent *stems*, two or three feet high, and strongly winged by the decurrent leaves. The *leaves* are smooth or slightly pubescent, alternate, sessile, decurrent, lanceolate, acuminate, unequally serrate, punctate. The *flowers* are large, numerous, of a bright-yellow color, loosely corymbose. *Peduncles* axillary, one-flowered, thicker above. *Involucre* with linear-acute scales. *Disk* semi-globose. *Rays* flat, cuneate, three to five-lobed. *Pappus* of five membranous, subulate, and awned scales.

History.—Sneezewort grows in all parts of the United States, flourishing best in meadows, moist fields, and other low damp grounds, and flowering from August to October. It has scarcely any smell, but a bitter, somewhat pungent or acrid taste. It has not been analyzed.

Properties and Uses.—Tonic, diaphoretic, and errhine. Useful in intermittent and other febrile diseases. The whole plant possesses errhine properties; but the flowers, and especially the central florets,

are the most active, and may be used in powder, as a snuff in headache, catarrh, deafness, and other affections where errhines are desired.

HELIANTHEMUM CANADENSE. (*Cistus Canadensis*.)

Frostweed.

Nat. Ord.—Cistaceæ. Sex. Syst.—Polyandria Monogynia.

THE HERB.

Description.—This plant is also known by the names of *Rock-rose*, *Frost-plant*, etc. It is herbaceous, and perennial, with a slender, rigid, pubescent, ascending stem, from six to eighteen inches high, and having erect, pubescent branches. The leaves are alternate, from eight to twelve lines long, and about one-fourth as wide, oblong, somewhat lanceolate, erect, entire, subsessile, tomentose beneath, and without stipules. The flowers are large and bright yellow; those which first appear are terminal, few or solitary, on short peduncles, with erosely-emarginate petals, about twice as long as the calyx; at a later period the flowers are very small, axillary, solitary or somewhat clustered, nearly sessile, sometimes destitute of petals, and usually wanting the two outer sepals of the calyx. Stamens declinate. The fruit is a smooth, shining capsule, with brown, scabrous, punctate seeds; the capsules of the apetalous or later flowers, not larger than a pin's head.

History.—This plant grows in all parts of the United States, in dry, sandy soils, and flowering from May to July. The whole plant is official. The leaves and stems of the plant are covered with a white down, and Eaton states that, in the months of November and December, he has seen these plants sending out, near the root, broad, thin, curved ice crystals, about an inch in breadth, which melted in the day, and were renewed in the morning. The plant has a bitterish, astringent, slightly aromatic taste, and yields its properties to hot water.

Properties and Uses.—This plant has long been used by Eclectics as a valuable remedy for scrofula, in which disease it has effected some astonishing cures. It is used in the form of decoction, syrup, or fluid extract; if taken in too large doses it will sometimes vomit. It is tonic and astringent, as well as antiscrofulous. In secondary syphilis, either alone, or in combination with *Corydallis Formosa*, and *Stillingia*, it forms a most valuable remedy. The decoction may be employed with advantage in diarrhea, as a gargle in scarlatina and aphthous ulcerations, as a wash in scrofulous ophthalmia, prurigo and other cutaneous diseases. Externally, a poultice of the leaves is applied to scrofulous tumors and ulcers. The fluid extract is the best form for internal use; dose, one or two fluidrachms, three or four times a day. A physician in the west, writes to me, that he procures an oil from this plant, which he finds

valuable in cancerous affections; how he prepares it is not stated. The *H. Corymbosum* or Frost-weed, with an erect, branching, canescent stem; lance-oblong, alternate leaves, canescently tomentose beneath; the flowers in crowded, fastigiata cymes; the primary ones on elongated, filiform pedicels, and with petals twice longer than the calyx; sepals villous-canescant, outer ones linear, obtuse; inner ones ovate, acute; is found growing in pine-barrens and sterile sands, in the Southern and Middle States. It possesses properties analogous to the preceding, and may be indiscriminately employed with it.

Off. Prep.—Decoctum Helianthemis.

HELIANTHUS ANNUUS.

Sunflower.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Frustranea.

THE SEEDS.

Description.—This is an annual plant, with an erect, rough stem, usually about seven feet high, but which under favorable circumstances, attains the height of fifteen and even twenty feet. The leaves are large, cordate, three-nerved, the upper alternate, the lower opposite. Peduncles thickening upward. Flowers large, nodding; rays yellow; disk dark-purple. Seeds numerous, dark-purple when ripe. A splendid variety occurs with the flowers all radiate.

History.—This well known plant is a native of South America, and is extensively cultivated in the gardens of this country, on account of its beautiful, brilliant, yellow flowers, which appear in July and August. The ripe seeds are the parts used, they are of a purplish color, externally, about four or five lines long, between two and three wide, two-angled, margins parallel, apex somewhat pointed, the base truncate, compressed, with longitudinal convex surfaces, so as nearly to present four angles; internally the testa is whitish, and the kernel is whitish, oily, rather sweetish, and edible. They contain a fixed oil which may be obtained by expression. The leaves are large, and when carefully dried, may be made into segars, very much resembling in flavor that of mild Spanish ones. The virtue of the seeds chiefly depends upon the fixed oil they contain.

Properties and Uses.—Sunflower seeds and leaves, are diuretic and expectorant, and have been used in pulmonary affections with considerable benefit. The following preparation has been of much efficacy in bronchial and laryngeal affections, and even in the cough of phthisis; it acts as a mild expectorant and diuretic: Take of sunflower seeds, bruised, two pounds, water five gallons; boil the two together until but three gallons of liquid remain, then strain, add twelve pounds of sugar, and

one and a half gallons of good Holland gin. The dose of this is from two fluidrachms to two fluidounces, three or four times a day, or whenever tickling or irritation of the throat, or cough is excessive, or when expectoration is difficult. Various agents may be added to this preparation, according to indications, as tincture of stillingia, tincture of balsam of Tolu, tincture of iodine, etc. An infusion of the pith of sunflower stem is diuretic, and may be used where this class of agents is indicated, also in many febrile and inflammatory forms of disease; it likewise makes a good local application in some forms of acute ophthalmia. The pith contains nitre, and has been proposed for the preparation of moxa; the quantity of nitre, however, varies, depending entirely upon the locality and character of soil in which the plant grows. The oil obtained from the seeds by expression, has been employed with benefit in cough, in dysentery, in inflammation of the mucous coat of the bladder, and in disease of the kidneys. To be given in doses of from ten to fifteen drops, two or three times a day. A teaspoonful of the oil taken at one dose, has produced active diuresis for four consecutive days, accompanied toward the termination with pain and debility in the lumbar region. The leaves are astringent.

HELLEBORUS NIGER.

Black Hellebore.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE ROOT.

Description.—Black hellebore has a black, perennial, tuberculated, horizontal, scaly root or *rhizoma*, whitish internally, and sending off numerous, long, fleshy, brownish-yellow fibers, which become dark-brown upon drying. The *leaves* are large, radical, on cylindrical peduncles from four to eight inches long, pedate, of a deep green color above, paler and strongly reticulated beneath; the *leaflets* are five or more, one terminal, two to four on each side supported on a single partial petiole, ovate-lanceolate, smooth, shining, coriaceous, and serrated near the top. The *scape* is shorter than the petiole, one or two-flowered, with ovate lacerated bracts immediately beneath the calyx, six or eight inches high, round, tapering, and reddish toward the base. The *flowers* are large, rose-like; the petaloid *calyx* consists of five large, ovate or roundish, concave, spreading *sepals*, at first white, then rose-red, and eventually becoming green. The *petals* are tubercular and two-lipped, of a greenish-yellow color, and shorter than the stamens. The *stamens* are very numerous and support yellow anthers. The *ovaries* are from six to eight in number, surmounted by a somewhat curved pistil. The *capsules* contain many black, shining seeds.

History.—Black Hellebore is a native of the mountainous regions of southern and temperate Europe, and is found in Greece, Austria,

Switzerland, France, Italy, and Spain. It is cultivated in many places, on account of its flowers appearing in winter, between December and February, on which account it is called the *Christmas Rose*. It is not the *Melampodium* of the ancients, so celebrated in mental diseases, which is now shown to be a distinct species, the *Helleborus Orientalis*, and which probably possesses similar medicinal virtues, as well as the roots of some other species of the same genus.

The whole root is generally kept in the shops, though the fibers are the only parts employed. It is a many-headed root, with a caudex or body seldom over half an inch in thickness, and several inches long, horizontal, sometimes contorted, uneven, knotty, with transverse ridges, slightly striated longitudinally, its upper surface having the remains of the leaf and flower-stalks, and thickly beset upon the sides and under-surface with fibers about as thick as a straw, and which when not broken, are from four to twelve inches long, smooth, brittle, externally black or deep-brown, internally white or yellowish-white, spongy, with a feeble odor, and a taste at first sweetish, then nauseously acrid and biting, but not very durable, and bitterish. At from two to six inches from their origin, they are furnished with small, slender branches. When fresh they are extremely powerful, producing when chewed and retained for a time upon the tongue, a burning and benumbing impression, like that caused by taking hot liquids into the mouth. Drying diminishes this acrimony, which becomes gradually weakened by age. Water or alcohol extracts its virtues, which are impaired by long boiling. Analysis has found in these fibers, a volatile oil, an acrid fixed oil, a resinous substance, wax, a volatile acid, bitter extractive, gum, albumen, gallate of potassa, supergallate of lime, a salt of ammonia, and woody fiber. Its acidity is supposed to depend on the volatile acid, while its purgative qualities are attributed to the resinous substance, from the fact that alcohol extracts the medicinal virtues of the fibers most effectually.

Properties and Uses.—In large doses a powerful poison, causing gastrointestinal inflammation, vomiting, purging, vertigo, cramp, convulsions and even death. Applied to the skin, the fresh root inflames and even vesicates. In medicinal doses, a drastic cathartic, diuretic, anthelmintic and emmenagogue. Formerly used in palsy, insanity, apoplexy, dropsy, epilepsy, etc., but seldom used at present; occasionally it is found useful in chlorosis, amenorrhea, etc. Dose of the powder, from five to ten grains; of the tincture, from one to two fluidrachms; of the extract, from two to five grains.

The *Helleborus Foetidus* or Bear's foot, possesses similar properties, but is scarcely known in this country. It has been used in asthma, hysteria, and for the removal of tapeworm, in powder or decoction.

Off. Prep.—Vinum Hæmatoxyli Compositum.

HELONIAS DIOICA.

Helonias.

Nat. Ord.—Melanthaceæ. Sex. Syst.—Hexandria Trigynia.

THE ROOT.

Description.—This plant, also known by the names of *False Unicorn-root*, *Drooping Starwort*, *Devil's Bit*, etc., is the *Veratrum Luteum* of Linnæus, and the *Melanthium Dioicum* of Walter. It is a herbaceous perennial, with a large, somewhat bulbous, premorse root, from which arises a simple, very smooth, somewhat angular stem or scape, one or two feet in height. The *cauline leaves* are lanceolate, acute, small, and at some distance from each other, without petioles; the *radical leaves* are broader, being from four to eight inches in length, by half an inch to an inch in width, narrow at base, and formed into a sort of whorl at the base of the scape. The *flowers* are small, very numerous, greenish-white, and are disposed in long, terminal, spicate, nodding, diœcious racemes, resembling a plume, and which are more slender and weak on the barren plants. *Male flowers* with white, linear-spathulate, obtuse, one-nerved petals; *stamens* rather longer than the petals; *filaments* subulate; *anthers* terminal, two-lobed; *ovaries* wanting. *Female flowers*, the raceme is generally few flowered, becoming erect; *petals* linear; *stamens* very short, abortive; *ovary* ovate, subtriangular, with the sides deeply furrowed; *stigmas* three, spreading or reflexed. *Capsule* ovate-oblong, tapering to the base, three-furrowed, opening at the summit. *Seeds* many in each cell, acute, compressed.

History.—This plant is indigenous to the United States, and is abundant in some of the Western States, growing in woodlands, meadows and moist situations, and flowering in June and July. It is also found in low grounds from Canada to Georgia and Louisiana. The plant is sometimes mistaken for the *Aletris Farinosa*, but may be identified by the leaves of the *aletris* being sharply pointed, with a straight slender spike of scattered flowers, while the *helonias* is not so sharply lance-shaped in its leaves, and has a thick plumose dioical spike.

The root is the officinal part; it is tapering, fibrous, about an inch and a quarter in length, and from two to six-eighths of an inch in diameter, very hard, transversely wrinkled, and abrupt or premorse at the end, appearing as though it had been cut or bitten off. There has been, and still exists much difficulty among druggists and herb-gatherers in determining the difference between the roots of *Aletris Farinosa* and *Helonias Dioica*; it has often been the case that these roots have been indiscriminately bought and sold. The specimens of *Helonias* which I have before me are from half an inch to two inches in length, and from four to six or eight lines in diameter, mostly premorse, but occasionally somewhat pointed, with many small, yellowish-white, thread-like fibers, from half an inch to two or three inches in length; externally, they are dark-

brown, transversely wrinkled, rough and uneven, with annular prominences which often have the appearance as if a small root had been driven into the end of a larger one and grew there; there are also many small openings, cups, pores, or raised cells, through which passed the fibers, and which will always be seen at the base of each fiber upon carefully removing it from the root; attached to the upper part of the root, will frequently be seen the remains of the scape and radical leaves. Internally, on cutting them transversely, a whitish, rough, circular center is presented, which is surrounded with a smooth substance of a similar or darker color, and near the margin of which may be observed at short distances from each other, dark spots or openings, which appear to be continuations of the fibers, or of the canals through which they pass; a longitudinal section exhibits a rough, whitish center one or two lines in diameter passing through the root, on each side of which is the smooth substance above referred to, with few or none of the dark spots. The roots have a faint, peculiar, unpleasant odor when bruised, and a peculiar bitter, somewhat aloetic taste, not so powerful in the dried ones as in the fresh. As far as I can recollect, the root of the aletris seldom exceeds an inch in length, is not premorse, has a brittle, scaly appearance, is blackish outside, brownish inside, and although having many fibers, the most of them pass from the upper and lateral portions of the root.

Properties and Uses.—*Helonias* is tonic, diuretic, and vermifuge; in large doses, emetic, and when fresh, sialagogue. In doses of ten or fifteen grains of the powdered root, repeated three or four times a day, it has been found very beneficial in dyspepsia, loss of appetite, and for the removal of worms. It is reputed beneficial in colic, and in atony of the generative organs. In uterine diseases it is held to be invaluable, acting as a uterine tonic, and gradually removing abnormal conditions, while at the same time it imparts tone and vigor to the reproductive organs. Hence, it is much used in leucorrhea, amenorrhea, dysmenorrhea, and to remove the tendency to repeated and successive miscarriages. The plant is said to kill cattle feeding on it; and the decoction to kill insects, bugs, and lice. Dose of the powder, from twenty to forty grains; of the decoction, from two to four fluidounces; of the hydroalcoholic extract from two to four or five grains. The *Helonias Bullata*, with purple flowers, and probably some other species, possesses similar medicinal virtues.

HEMIDESMUS INDICUS.

Indian Sarsaparilla.

Nat. Ord.—Asclepidaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This is a climbing plant with a long and slender root, with few ramifications, covered with rust-colored bark, and with twining,

diffuse or climbing, woody, slender *stems*, from the thickness of a crow's quill to that of a goose's, and nearly smooth. The *leaves* are opposite, on short petioles, entire, smooth, shining, and of firm texture; they vary much in shape and size, those on the young shoots that issue from old roots, being linear, acute, and striated down the middle with white; while the others are generally broad-lanceolate, and sometimes ovate or oval. The *stipules* are four-fold, small, on each side of each petiole, caducous. The *flowers* are small, externally green, internally a deep-purple, and are disposed in axillary, sessile racemes, which are imbricated with flowers, and then with scales like bracts. The *calyx* is five-parted, with acute divisions: the *corolla* is flat, rotate, with oblong, pointed divisions, rugose inside. The *follicles* are long, slender, and spreading.

History.—This plant is the *Periploca Indica* of Willdenow, and the *Asclepias Pseudosarsa* of Roxburgh; it is a native of Lower India and Ceylon, and other parts of the East Indies. It has been used as a medical agent in India for a long time, and was unknown to the profession until its introduction in 1819 by Dr. Ashburner. The root is the part used; this is long, tortuous, round, rugose, with a brownish cork-like bark, which is marked by longitudinal furrows and transverse fissures, with an internal, yellowish, ligneous center. The odor is peculiar and somewhat aromatic, somewhat resembling that of Orris Root, and the taste bitterish. Mr. Garden found it to contain a peculiar volatile, crystallizable, acid principle, on which the properties of the root depend. He called it *Smilasperic Acid*, from a belief that the root was derived from *Smilax Aspera*. The name suggested by Pereira is the most correct, viz: *Hemidesmic Acid*.

Properties and Uses.—Indian Sarsaparilla is said to be tonic, diuretic, and alterative. It has been employed as a substitute for sarsaparilla, and has proved successful in syphilitic affections when that medicine has failed. It increases the appetite, acts as a diuretic, and improves the general health. Likewise said to be useful in nephritic complaints, scrofula, cutaneous diseases, and in the sore-mouth of children. Notwithstanding these statements it is by no means so efficacious and certain as many of our indigenous remedies. It is used in the form of infusion, as boiling dissipates its volatile active principle; two ounces of the root may be infused in a pint of boiling water for an hour; the whole of which may be taken in the course of twenty-four hours.

HEPATICA AMERICANA.

Kidney Liverleaf.

HEPATICA ACUTILOBA.

Heart Liverleaf.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE PLANT.

Description.—*Hepatica Americana* of De Candolle, is the *Hepatica Triloba* of Willdenow. It has a perennial fibrous *root*, with *leaves* which are cordate at base, three-lobed; *lobes* unequal, rounded, obtuse, or acute, coriaceous, nearly smooth, purplish beneath, green-mottled with purple above, and supported on hairy footstalks from four to eight inches long, which spring directly from the root. The *scapes* or *flower-stems* are several in number, as long as the petioles, round, hairy, terminating in a single white, bluish, or purplish flower, and invested at base with membranous sheaths. *Flowers* at first drooping, afterward erect. *Involucre* resembling a calyx, very hirsute, with deep, ovate, entire segments. *Sepals* in two or three series, purplish or white, equal, ovate, obtuse. *Stamens* subulate; *anthers* elliptic. *Seeds* ovate, acute, awnless. *HEPATICA ACUTILOBA* differs in having cordate leaves, with from three to five entire, acute lobes, and the involucreal leaves are acute.

History.—But one species of *Hepatica* is generally admitted by Botanists, the differences in form, color, etc., being considered as accidental; De Candolle, however, divides them into the two species above described, and which has been adopted by the pharmacopœists of this country. These plants are common to the United States, growing in woods, and upon the sides of hills and mountains; the *H. Americana*, which is the most common, preferring the south side, and the other the north. They both bear white, blue, or purplish flowers which appear late in March or early in April. The whole plant is used; it is inodorous, with a mucilaginous, somewhat astringent, slightly bitterish taste, and yields its active properties to water. The term *Liverwort*, sometimes erroneously applied to it, belongs to the cryptogamous genus, *Marchantia Polymorpha*.

Properties and Uses.—A mild, demulcent tonic and astringent. It has been used in infusion, in fevers, hepatic complaints, hemoptysis, coughs, etc., but in severe cases it is unavailable. The infusion may be taken *ad libitum*.

HERACLEUM LANATUM.

Masterwort.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This plant, sometimes called *Cow-parsnep*, has a large, spindle-shaped, perennial *root*, with a strong, unpleasant smell, which

sends up annually a hollow, thick, furrowed, branching and pubescent stem, from three to five feet high, and often an inch or more in diameter at the base. The leaves are very large, on downy, channeled petioles, and ternately divided; the segments roundish-cordate, unequally lobed; the lobes acuminate, almost glabrous above, and woolly underneath. The flowers are white, and are disposed in large, spreading umbels, having an involucre of from six to ten oblong-lanceolate, deciduous leaflets. Involucel composed of lanceolate-leaflets which are narrowed to a long point. Petals of the exterior flowers unequal, as if unequally two-cleft, owing to the enlargement of the lobes on each side of the inflexed apex. Fruit nearly half an inch long, often emarginate. Vittæ of the channels clavate. Commissure usually with two vittæ.

History.—Found growing in meadows and along fences and hedges from Canada to Pennsylvania, and flowers in June. The root is officinal, resembles common parsley, has a strong, disagreeable odor, and an acrid taste. When applied to the skin, both the root and leaves excite redness and inflammation. When gathered from a damp situation, supposed to be poisonous.

Properties and Uses.—Stimulant, antispasmodic and carminative. Used in flatulency and dyspepsia, in decoction; and two or three drachms of the powdered root, taken daily in epilepsy, and continued for some time, with a strong infusion of the leaves and tops at night, has been found successful. Recommended, also, in asthma, colic, amenorrhea, dysmenorrhea, palsy, apoplexy, intermittents, etc., in doses of one drachm.

HEUCHERA AMERICANA.

Alum Root.

Nat. Ord.—Saxifragaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This plant, sometimes called *American Sanicle*, is herbaceous and indigenous, with a perennial, knotty, yellowish root. The leaves are all radical, on very long downy petioles from two to eight inches in length, roundish-cordate, hispidly pilose, about seven-lobed; and from two to three and a half inches in diameter; the lobes are short and roundish, crenate-dentate, with dilated mucronate teeth. Numerous scapes or flower-stems are sent up by the same root, from two to four feet high, erect, naked, viscid-pubescent in their upper part, and terminating in loose, pyramidal, dichotomous panicles, which are nearly one-third the length of the scape. The calyx is permanent, five-cleft, campanulate, small, obovate, striated, with very obtuse segments, and more conspicuous than the petals. The petals are purplish-white, or rose-colored,

minute, spathulate, and inserted into the margin of the calyx, between its segments. The *filaments* are twice as long as the petals, yellowish, inserted opposite the segments of the calyx, persistent, and surmounted by small, red, globose anthers. *Capsule* ovate. *Seeds* minute, oblong, black, very hispid.

History.—This plant is a native of North America, and is found in shady, rocky situations, from New England to Carolina, and westward; it flowers in June and July. The root is the officinal portion; it is horizontal, somewhat compressed, knotty, irregular, yellowish, inodorous, and of a powerfully styptic taste. It yields its medicinal virtues to water. No analysis has been made of this plant. There are several species of this plant, the *Heuchera Caulescens*, *H. Pubescens*, and others which possess similar properties, and are often collected and sold with the roots of *H. Americana*.

Properties and Uses.—Alum root, as its name would indicate, is a powerful astringent, so intensely so, as seldom to be administered internally; yet it would undoubtedly prove useful in small doses, in all cases where astringents are indicated. An aqueous extract will be found very beneficial in diarrhea and dysentery in the second stages, in hemorrhages, and other similar diseases. Externally, the powdered root may be applied to hemorrhages, epistaxis, wounds, foul and indolent ulcers, etc. The decoction is useful in aphthous sore-mouth, and soreness of the throat and fauces; it may be used as a wash or gargle. Taken internally, in doses of a wineglass half-full three or four times a day, it has been efficacious in diabetes, and in bleeding piles, employing it, in this last complaint, by injection also. Equal parts of alum root and black-cohosh root in decoction, form an excellent local application in leucorrhea and excoriation of the cervix uteri. Some practitioners employ this root indiscriminately with that of the *Geranium Maculatum*; it is, however, more powerfully astringent, and probably a preparation, equal at least to *geraniin* in medical virtue might be obtained from it.

HIERACIUM VENOSUM.

Hawkweed.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE ROOT AND LEAVES.

Description.—This plant, also known as *Veinyleaved Hawkweed*, *Rattlesnakeweed*, *Striped Bloodwort*, etc., has a perennial root, with a stem or scape from one to two feet in height, dark-brown, slender, sometimes naked, sometimes with one or more glabrous cauline leaves, several times dichotomous, so as to form a compound diffuse corymb, with a subulate bract at each division. The *radical leaves* are obovate, or oblong-spathulate, entire or slightly toothed, subsessile, thin, a little

hairy above, nearly glaucous, and purplish beneath, ciliate on the margins and midrib, marked with purple veins, and the first that unfold are appressed to the ground. *Heads* small, and about twenty-flowered; *base of involucre* somewhat hispid with short hairs; *inner scales of involucre* glabrous or nearly so. *Florets* bright-yellow. *Achenia* linear, not tapering above.

History.—Hawkweed grows in many parts of the United States, but is more common to the northward and eastward, growing upon dry hills, and in pine woods. It bears yellow flowers from May to July. The leaves and roots are the parts that have been used; they have no odor, but a bitterish and somewhat mucilaginous taste. Water extracts their virtues. They have not been chemically examined.

Properties and Uses.—This plant is tonic, astringent, and expectorant; it has been used in scrofula, menorrhagia, hemoptysis, and other hemorrhages, in decoction. The powdered leaves and root have been used as a snuff in polypus of the nose, combined with bloodroot. Said to be efficient against the bites of venomous snakes. The juice of the fresh leaves are recommended as a cure for warts. Dose of the infusion or syrup, from two to four fluidounces.

HIRUDO MEDICINALIS.

The Leech.

Description.—The leech belongs to *Class 1* of invertebrated articulated animals, called *Annelides*, composed of worms with red blood, having soft retractile bodies composed of numerous segments or rings, usually breathing by means of branchiæ, with a nervous system consisting in a double-knotted cord, the contractile power of their segments supplying the place of feet; to *Order 3* of this class, called *Abranchiata*, comprising worms with no apparent external organ of respiration; and to *Family 2*, called *Asetigera*, without setæ to enable them to crawl. The leech is an aquatic worm, with a flattened body, tapering toward each end, and terminating in circular flattened disks, the hinder one being the larger of the two. It swims with a vertical undulating motion, and moves when out of the water by means of these disks or suckers, fastening itself first by one and then by the other, and alternately stretching out and contracting its body. The mouth is placed in the center of the anterior disk, and is furnished with three cartilaginous lens-shaped jaws at the entrance of the alimentary canal. These jaws are lined at their edges with fine sharp teeth, and meet so as to make a triangular incision in the flesh. The head is furnished with small raised points, supposed by some to be eyes. Respiration is carried on through small apertures ranged along the inferior surface. The nervous system consists of a cord extending the whole length, furnished with numerous

ganglions. The intestinal canal is straight and terminates in the anus, near the posterior disk. Leeches are hermaphrodite, but impregnate each other mutually; they are oviparous having from six to fifteen eggs contained in a spongy, slimy cocoon, which are deposited near the water's edge, and hatched by the heat of the sun. They do not generate until they are six or seven years old, and the young leeches leave the eggs in about twenty-five days.

History.—There are several species of the leech employed in medicine, the most common of which are the gray and green leech of Europe, and the American leech. The European varieties are both marked with six longitudinal dorsal ferruginous stripes, the four lateral ones being tessellated with black spots. The color of the black varies from a blackish to a grayish-green. The belly of the *H. Medicinalis*, or gray leech, is grayish or yellowish, more or less speckled with black spots; that of the *H. Officinalis* or green leech, is paler, more yellowish or greenish, and unspotted. They are from two to four inches in length, and inhabit marshes and running streams, in various parts of Europe. The *H. Decora*, or American leech has its back of a deep pistachio-green color, with three longitudinal rows of somewhat quadrate spots, the central being of a bright brownish-orange color, and the two lateral of a black. The belly is of the same color, with scattered black dots. It is from two to three inches in length, and sometimes larger.

Leeches are very troublesome to preserve, often dying suddenly and in numbers, and various means have been adopted to keep them healthy. The most common cause of their sickness and death is the formation of a slimy matter on their skin, and which they are in the habit of removing by drawing themselves through moss. Large quantities, when kept together, are more liable to disease and mortality, than when kept together in small numbers. They should be kept in jars, in clear, soft water, which should be changed twice a week in winter, and every other day in summer. The jar must be covered with a linen cloth, and placed in a situation not liable to sudden changes of temperature, nor to strong odors. They will live a long time, and continue active and healthy without any other attention than that of frequently changing the water in which they are kept. As soon as a leech is known to be dead, it should be instantly removed, and fresh water applied. In country places, leeches may be preserved in a jar, with small holes to admit the water, in the bottom of which are placed moss and pebbles, and placed in a spring or running stream of soft water. A very good method is to keep them in loose turf or moss, kept constantly moist with rain-water, and packed in vessels which admit of a free renewal of air all the while.

Properties and Uses.—Leeches are occasionally used as affording the least painful, and in many instances the most effectual means, for the local abstraction of blood, and may be applied to parts which, either from their situation or great tenderness, will not admit of the use of

cups. They are used generally in local inflammations, bruises, etc. In applying them, the hair should be shaved off, if there be any, and the part well cleansed with soap and water, and afterward with pure water. If the leech does not readily bite, the skin should be moistened with a little blood or sweet milk. When it is required that it should bite in one particular spot, it may be placed in a quill or tube, and held over the spot until it does take hold, when the quill may be withdrawn. When a leech is gorged, it drops off. One European leech will draw from half an ounce to an ounce of blood. Six American are applied for every fluidounce. They may be separated from the skin at any time, by sprinkling a little salt upon them, which will also make them disgorge after they have dropped off. But the usual method is to draw the leech through the fingers, from the tail to the head, with gentle pressure, and thus squeeze out the blood. After emptying them, they should be placed in clean water, which must be frequently changed, and they should also be kept by themselves for several days, or until they have recovered their activity. When the hemorrhage from leech-bites is troublesome, it may be stopped by tannin or other astringents, colloidion, or even a single stitch of the needle, which need not penetrate deeper than the cutis. Should a leech get into the stomach, a solution of salt may be drank, which is poison to it, and will kill it.

HORDEUM DISTICHON.

Barley.

Nat. Ord.—Graminaceæ. *Sex. Syst.*—Triandria Digynia.

THE DECORTICATED SEEDS.

Description.—Various species of barley are cultivated in different parts of the world; the most common, and which have been introduced into this country, are the following:—HORDEUM VULGARE, has an erect, smooth, fistular *culm* or *stem*, from two to four feet in height, with alternate, sheathing, lanceolate, roughish, and pointed *leaves*; the *sheaths* auriculate at the throat. The *flowers* are all perfect, and disposed in a thick, terminal spike, about three inches long, the axis of which is dentate, and on each tooth supports three sessile flowers. The *calyx* or *outer chaff* has two valves; the *corolla* or *inner chaff* is also composed of two valves, of which the exterior is larger than the other, and terminates in a long, rough, serrated awn or beard. The *fruit* or *seeds* are arranged in four rows.

Hordeum Distichon is distinguished by its flat spike or ear, having on each flat side a double row of imperfect or male florets without beards, and on each edge, a single row of perfect or hermaphrodite florets; the fruit or seeds, are, therefore, in two rows.

History.—Barley is thought to be a native of Central Asia, but the subject is involved in much uncertainty. The seeds are officinal; they are oval, oblong, pointed at one end, obtuse at the other, marked with a longitudinal furrow on one side, externally yellow, internally white, of a faint odor when in mass, and having a mild, sweetish taste. When deprived of the husks, and rounded and polished by a peculiar process, it is called *Pearl barley*—*hordeum perlatum*; this is the proper officinal form of barley, which is kept in the shops, and when ground into a coarse flour, it forms barley meal. It abounds in starch, with some gluten, sugar and gum, and is destitute of *hordein*.

When the entire grain is moistened, and exposed in mass to a summer temperature until it begins to germinate, and is then deprived of vitality by a stronger heat, it is called *malt*, and in this form barley is largely consumed in the manufacture of malt liquors. The process of making malt increases the quantity of sugar, starch, and gum, while that of the *hordein* becomes lessened—thus, 100 parts of malt contain 56 of starch, 1 of gluten, 15 of sugar, 15 of gum, 1 of yellow resin, and only 12 of *hordein*. While barley in its natural state consists in 100 parts of 32 of starch, 3 of gluten, 5 of sugar, 4 of gum, 1 of yellow resin, and 55 of *hordein*. *Hordein* is a principle very closely resembling lignin, and which, it has been suggested by Berzelius, may be an intimate mixture of vegetable fiber with gluten and starch. It may be obtained by boiling the starchy matter which is obtained by kneading barley-meal in a cloth with water; the undissolved residuum, when well washed with boiling water, is *hordein*. It is a yellowish, granular powder, like sawdust, yielding oxalic acid when treated with nitric acid, and consisting according to Marcet of 12 equivalents of carbon, 11 of hydrogen, and 10 of oxygen. M. Guibort and Dr. Thomson consider it to be the amylin or tegumentary membrane of the starch globules, which are stronger and more solid in barley starch than in other kinds. Barley is insoluble in alcohol, ether, or the fixed and volatile oils; but alcohol or ether removes from it a little resin. Boiling water dissolves a large proportion of it. A peculiar substance has been found in barley-seeds after having undergone germination, by MM. Payen and Persoz, which they have named *Diastase*, on account of its effect in detaching the principles of the starch-globules from one another. During the process of germination, the rupture of the starch globules, and the separation of their tegumentary amylin from the contained amidin, is the first change effected, and which is succeeded by conversion of the amidin into sugar and dextrine, which changes are owing to this principle, which is developed at the time in the seed. The same substance has likewise been found in the seeds of oats and wheat, and in the potato, but only after these have undergone germination.

Diastase may be applied to various useful economical purposes; it is obtained by moistening ground malt with half its weight of cold water,

expressing strongly, and adding to the viscid liquid obtained by expression just enough of alcohol to destroy its viscosity, then filtering to separate the coagulable albumen, and finally adding fresh alcohol to the liquid, which precipitates the diastase in an impure state. It may be purified by three successive solutions in water and precipitations by alcohol; after which it is best obtained in the dry state by exposing it in thin layers to a current of air about the temperature of 110° . When pure, diastase is solid, white and amorphous, tasteless, neutral, soluble in water and weak alcohol but insoluble in undiluted alcohol. Its aqueous solution is not precipitated, like that of starch, by lime, baryta, or diacetate of lead; on keeping it becomes acid. Its most remarkable property is that of converting starch and water, at a temperature of about 160° , into sugar and dextrine. It has no action upon either gum or sugar, and yet one part of it added to two thousand parts of starch suspended in water, causes the starch-globules speedily to burst, the teguments separating from the contained amidin, which by the prolonged action of the above heat, effects this extraordinary conversion without any perceptible difference in the weight of the substances employed.

The different kinds of beer, ale, and porter, are made from malt, with the addition of hops and other articles. Malt has a sweetish, mucilaginous, rather agreeable taste; an infusion of it at 160° completes the conversion of the starch into sugar and gum; yeast being then added at a temperature between 60° and 80° , vinous fermentation takes place, carbonic acid is disengaged and alcohol formed. The sugar is the source of the alcohol existing in malt liquors, while the gum or dextrine is the cause of their viscosity, and the permanence of their effervescence and frothy top.

Properties and Uses.—Pearl barley in decoction is a nutritive and demulcent, and on account of its mild and unirritating qualities is much used as an article of diet for the sick and convalescent, acting at the same time, if the barley itself be swallowed, as a gentle aperient. The decoction is employed for suspending powdered drugs insoluble in water, and also as a drink in febrile diseases, catarrh, dysentery, inflammation of the bladder, gonorrhea, and chronic mucous inflammations. Combined with hops, or in the form of beer, ale, or porter, it forms a valuable tonic in many chronic exhausting diseases, and in convalescence. From two to four ounces of malt boiled in a quart of water, afford a more demulcent and nutritious liquor than barley, and is consequently better adapted to cases requiring a sustaining course of treatment. In making the decoction of barley, two ounces must first be washed with cold water, and all extraneous matters removed; then place the barley in half a pint of water, boil for a short time, strain off the water, and throw it away, as this is only employed to remove mustiness, or any disagreeable flavor which the barley may have acquired. To the barley thus prepared, add four pints of boiling water, boil down to two pints

and strain. The decoction may have other articles added in the course of its preparation, varied to suit the taste of the patient, as sugar, sliced figs, raisins, liquorice root, etc. It may be drank freely.

Off. Prep.—Decoctum Hordei.

HUMULUS LUPUS.

Hops.

Nat. Ord.—Urticaceæ. *Sex. Syst.*—Dioecia Pentandria.

THE STROBILES OR CONES.

Description.—This plant has a perennial *root*, which sends up annual, angular *stems*, rough backward, with minute reflexed hairs, and twining around neighboring objects in a spiral direction with the sun, and climbing to a great height. The *leaves* are opposite, on long winding rough petioles; the smaller ones cordate, the larger from three to five-lobed; all are deep green, serrated, veiny, and extremely rough. The *flowering branches* are axillary, angular and rough. The *stipules* are two or four, between the petioles, smooth, ovate, reflexed. The *flowers* are numerous, axillary, and of a greenish color. The male flowers are very numerous, panicle and yellowish-white; *sepals* five, oblong, obtuse, spreading, concave; *stamens* short; *anthers* oblong, opening by two terminal pores. The female flowers are pale-green, and grow on a separate plant in the form of an ament, having each a pair of flowers supported by a bract, which is ovate, acute, and tubular at the base; sepals solitary, obtuse, smaller than the bracts, and enveloping the ovary; *ovary* roundish, compressed; *stigmas* two, long, subulate, downy. The bracts enlarge into a persistent catkin or strobile, each bract inclosing a nut enveloped in its permanent bractlet, and some grains of a yellow resinous secretion.

History.—The Hop plant is a native of Europe, and also of North America. It is sometimes found growing wild in the Eastern States, and was found in abundance by Nuttall on the banks of the Mississippi and Missouri. It is also indigenous in the Canary Islands, and is said to occur in China. It is extensively cultivated for its cones or strobiles which are employed in medicine and the manufacture of malt liquors. A few layers of the barren vines planted among the fertile ones, is said to be profitable by increasing the weight of the produce. The part of the plant used in medicine is the strobiles, which are collected when fully ripe, dried by artificial heat, and packed in bales. The strobiles, known in commerce by the name of *Hops*, consist of numerous, thin, somewhat translucent, veined, leaf-like scales, of a pale greenish-yellow color, having near their base two small, round, black seeds. They have a strong, peculiar, somewhat narcotic and fragrant odor, which is lost by age, and a bitter, aromatic, and slightly-astringent taste. Though

brittle when dried, yet they are not readily pulverized. Water takes up their properties by decoction, but long boiling dissipates them. The decoction turns litmus paper red, becomes deep-green with the salts of iron, and turbid with the solution of isinglass; a better solvent than water is proof-spirit.

The active properties of hops depend upon a yellow, granular powder secreted by the scales, and which is found in abundance in the dried fruit; the scales, however, contain similar virtues though in an inferior degree. This yellow powder is called *Lupulin* (*Lupulina*), and may be obtained by threshing or rubbing, and sifting the strobiles, of which it constitutes from one-tenth to one-sixth by weight. It is in rounded or reniform grains, of a cellular texture, golden-yellow color, and somewhat transparent; the axis around which the cells are arranged is called the hilum. Lupulin has the peculiar flavor of hops; it is inflammable, and becomes adhesive by moderate heat. Unless carefully dried it soon loses its taste and odor, which, under all circumstances, are impaired by keeping. It is always preferable to the hop for officinal purposes. Lupulin has been found to consist of resin, volatile oil, bitter principle, lignin, and traces of tannin, gum, stearin, and various salts. It is probably to the oil and bitter extract, that its virtues depend, and which are taken up by alcohol. The *volatile oil* is yellowish, of an acrid taste, having the odor of hops, and lighter than water; it may be obtained by distillation with water.

The bitter principle, called *Lupulite* by the French chemists, may be procured by treating the aqueous extract of lupulin mixed with a little lime, with alcohol, evaporating the tincture and forming an alcoholic extract, dissolving this extract in water, and again evaporating to form a second aqueous extract, which is to be washed with ether. When pure, lupulite is yellowish, inodorous, but when heated giving off the peculiar smell of hops, of a bitter, hop taste, slightly soluble in water, which takes up five per cent. of its weight, readily soluble in alcohol, almost insoluble in ether, neutral, free from nitrogen, and an excellent tonic. The weak acids or alkaline solutions, and metallic salts, scarcely affect it.

Properties and Uses.—Hops are tonic, hypnotic, febrifuge, antilithic, and anthelmintic. Their tonic and anthelmintic properties are small, and probably depend upon their bitterness; they possess no antiperiodic virtues. Sometimes they cause diuresis, and are said to correct lithic acid deposits. They are principally used for their sedative or hypnotic action—inducing sleep, relieving restlessness, and alleviating pain, but which they often fail to accomplish. A pillow stuffed with hops has long been a popular remedy for procuring sleep. The lupulin or its tincture is used in delirium tremens, and watchfulness in connection with nervous irritation, anxiety or exhaustion; it does not disorder the stomach nor cause constipation, as with opium. Also useful in after-

pains, to prevent chordee, suppress venereal desires, and allay the pain attendant on gonorrheal disease. Externally, in the form of a fomentation alone, or combined with boneset, or other bitter herbs, hops have proved beneficial in pneumonia, pleurisy, gastritis, enteritis, also as an application to painful swellings or tumors. An ointment made by boiling two parts of stramonium leaves and one of hops, in lard, has proved an effectual application in salt-rheum, ulcers, and painful tumors. The dose of lupulin is from six to ten grains, and which may be given in powder, or in pill made by merely rubbing it in a warm mortar till it acquires a pilular consistence. The tincture of lupulin may be given in doses of from one to four fluidrachms. The decoction of hops is seldom employed. Ale, porter, and beer are frequently administered in cases of debility in the absence of inflammatory symptoms, as tonic, stimulant, and nutritive agents. The ethereal tincture of lupulin forms what is termed the ethereal oil of lupulin, by allowing the ether to spontaneously evaporate. It produces at first a stimulant influence, succeeded by a very agreeable, calming sensation, and has been used with advantage in some cases of nervous irritability where opium and other narcotics failed. It does not, however, appear to possess any narcotic properties. A mixture of oil of chamomile one fluidrachm, and ethereal oil of lupulin one fluidrachm and a half, dissolved in sulphuric ether half a fluidounce, has been found beneficial in dysmenorrhea, and other painful uterine diseases, in doses of from thirty to sixty drops, every three or four hours.

Off. Prep.—*Extractum Lupulinæ*; *Infusum Humuli*; *Tinctura Lupulinæ*; *Unguentum Humuli*.

HYDRANGÆA ARBORESCENS.

Hydrangæa.

Nat. Ord.—Saxifragaceæ. *Sex. Syst.*—Decandria Digynia.

THE ROOT.

Description.—This plant, sometimes called *Seven-barks*, *Wild Hydrangæa*, etc., is the *Hydrangæa Vulgaris* of Michaux and Pursh. It is an indigenous shrub, smooth or nearly so, attaining the height of five or six feet, with opposite, petiolate leaves, which are ovate, obtuse at base, rarely cordate, acuminate, serrate-dentate, nearly smooth, and green on both sides. The flowers are often all fertile, numerous, small, white, becoming roseate, and disposed in fastigate cymes. *Calyx-tube* hemispherical, eight or ten ribbed, coherent with the ovary; the *limb* four or five-toothed, persistent; *petals* ovate, sessile; *stamens* eight or ten, slender; *capsule* crowned with the two divergent styles, two-celled below, opening by a foramen between the styles; *seeds* numerous.

History.—This elegant shrub grows abundantly in the Southern, Middle, and Western States, in mountains and hills, and on rocks and near

streams. The bark is rough, peeling off—each layer being of a different color, and which has probably given origin to the name “Seven-barks.” It is quite common in the Susquehanna and Schuylkill valleys, and its flowers are often met with in bouquets in the markets of Philadelphia. The root is the part that has been employed; it is formed of numerous radicles, sometimes not larger than a goosequill, and again half an inch or more in diameter, and of considerable length. These proceed from a caudex which sends upward numerous divergent branches. When fresh, the root and stalks are very succulent, containing much water, and can easily be cut; and the root likewise contains a great deal of mucilage, with albumen and starch. When dry they are very tough and resistant, and exceedingly difficult to bruise or cut, hence they should be bruised while fresh, or which is better, cut into short transverse sections, which facilitates the drying. The bark of the dried root has a rather pungent, aromatic, not disagreeable taste, somewhat similar to that of cascarilla bark. The stalks contain a pith which is easily removed, and they are used in some parts of the country for pipe-stems. Mr. Joseph Laidley, of Richmond, Va., found it to contain gum, albumen, starch, resin, soda, lime, potassa, magnesia, sulphuric and phosphoric acids, and a protosalt of iron.

Properties and Uses.—This plant was introduced to the profession by Dr. S. W. Butler, of Burlington, N. J., as a remedy for the removal of calculus or gravelly deposits in the bladder, and for relieving the excruciating pain attendant on the passage of a calculus through the ureter; and from the reports made, it certainly deserves a full and thorough investigation. The power of curing stone in the bladder is not claimed for it; it is only while the deposits are small, when in that form of the disease known as gravel, that it is an efficient remedy; then by removing the nucleus, which, if allowed to remain in the organ, would increase in size and form stone, the disease is averted, and when employed at this stage, it is said to have proved beneficial in every instance, and as many as 120 calculi have been known to come from one person under the use of this remedy. The effect of the plant, Dr. Butler states, is to remove by its own specific action on the bladder, such deposits as may be contained in that viscus, provided they are small enough to pass through the urethra. The mode of using it, is to prepare a concentrated syrup of it with sugar or honey, and give a teaspoonful three times a day; or a simple decoction of the root may be taken freely. If taken in overdoses it will produce some unpleasant symptoms, as dizziness of the head, oppression of the chest, etc. The leaves of Hydrangæa, are said by Dr. Eoff to be tonic, sialagogue, cathartic, and diuretic.

HYDRASTIS CANADENSIS.

Golden Seal.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE ROOT.

Description.—This is an indigenous plant, which is also known by the various names of *Yellow Puccoon*, *Ground Raspberry*, *Turmeric Root*, etc.; it has a perennial root or *rhizoma*, which is tortuous, knotty, creeping, internally of a bright-yellow color, with numerous long fibers. The *stem* is erect, simple, herbaceous, rounded, pubescent upward, from six to twelve inches in height, becoming purplish, and bearing two unequal terminal leaves. The *leaves* are two only, alternate, palmate, with from three to five lobes, hairy, dark-green, cordate at base, veiny, the lower leaf petiolate, the other sessile, from four to nine inches wide when full grown, and the segments serrated. The *flower* is solitary, terminal, small, white or rose-colored and on a peduncle about two inches in length. The *calyx* consists of three petaloid, deciduous, broadly-ovate, pale greenish-white, concave, slightly downy sepals, which fall away when the flower opens. *Stamens* many, longer than the pistils. *Filaments* flat linear-lanceolate, having the cells of the anther on their edge at the apex. *Pistils* several; *ovary* oval, glabrous, attenuated upward into a short style. *Stigma* obtuse, scarcely lobed. The *fruit* resembles a raspberry, is red, and consists of many little two-seeded drupes collected into a globose head, and each crowned with the persistent style; *seeds* nearly black, obovate, polished, having a minute embryo at the base of a fleshy and oily albumen.

History.—This plant is found growing in shady woods, in rich soil and damp meadows, in different parts of the United States and Canada, but is more abundant west of the Alleghanies. It flowers in May and June. The root is the officinal part; it consists of a tortuous, knotty caudex, with numerous long fibers, and is of a bright-yellow color. In the fresh state it is juicy, and when dried loses much of its weight. Its odor is strong and somewhat narcotic, with a very bitter taste. Its virtues are imparted to water or alcohol. Analysis has found it to contain resin, fatty matter, albumen, starch, yellow-coloring matter, sugar, lignin, various salts, and a peculiar, nitrogenous, crystallizable substance, called *Hydrastin*. The root of *Hydrastis* yields a brilliant yellow color, which appears to be permanent, and which might be employed to dye silk, wool, linen, etc.; by the addition of indigo it affords a beautiful green.

Properties and Uses.—This remedy is peculiar to Eclectics, and ranks among their most valuable agents. It is a powerful tonic, at the same time exerting an especial influence upon mucous surfaces and tissues with which it comes in contact. Internally, it is successfully adminis-

tered in dyspepsia, chronic affections of the mucous coats of the stomach, erysipelas, remittent, intermittent, and typhoid fevers, torpor of the liver, and wherever tonics are required. In conjunction with Geraniin it forms a very efficient remedy in chronic diarrhea and dysentery. In some instances it proves laxative, but without any astringency; and seems to rank in therapeutical action between rhubarb and bloodroot. Externally, and as a topical application, the decoction or tincture proves a superior remedy in all chronic mucous inflammations. In some cases of opacity of the cornea, as well as in other forms of ophthalmic disease, I have found the following preparation more efficacious than the usual caustic solutions: Mix together two parts of decoction of Hydrastis, and one of the saturated tincture of Aralia Spinosa, and apply to the eye with a camel's hair pencil, two or three times a day. The decoction of hydrastis to be made by evaporating a strong decoction of the root to the consistence of mucilage or syrup. It has been used in ophthalmic diseases, with much success in the following form: Tincture Capsicum two fluidrachms, tincture Hydrastis three fluidrachms, Olive Oil two fluidounces; shake well together each time before using, and apply with camel's hair pencil. A strong decoction of two parts of hydrastis, and one of geranium maculatum, is very valuable in gleet, chronic gonorrhea, and leucorrhea, used in injection; it is likewise of much benefit in *incipient stricture, spermatorrhea, and inflammation and ulceration of the internal coat of the bladder*. Ulceration of the internal coat of the bladder has been cured by the decoction of Hydrastis alone. It must be injected into the bladder, and held there as long as the patient can conveniently retain it—to be repeated three or four times a day, immediately after emptying the bladder. Combined with Caulophyllum, in strong decoction, and sweetened with honey, it is a superior remedy in all ulcerations of the mouth and fauces, both as a gargle or wash, and taken internally. The peculiar action of this agent on mucous tissues, I noticed some sixteen years ago, since which I have successfully continued its use in inflammation and ulceration of the bladder, diseases of the eye, dyspepsia, etc. Prof. R. S. Newton, to whom I made known its value in these diseases, has also used it with a success similar to my own. When taken in very large doses, I have known the decoction of Golden Seal to produce excessive secretion from the mucous surfaces of the mouth and nose, so much so, that the secretions were removed by the patients in long, tenacious shreds or pieces. Dose of the powder, from ten to thirty grains; of the tincture, from one to two fluidrachms; of the hydro-alcoholic extract, from two to five grains.

Off. Prep.—Decoctum Hydrastis; Extractum Hydrastis Hydro-alcoholicum; Lotio Hydrastis Composita; Tinctura Hydrastis; Tinctura Hydrastis Composita; Vinum Hydrastis Compositum.

HYDRASTIN.

Hydrastin.

THE ACTIVE PRINCIPLE OF HYDRASTIS CANADENSIS.

Preparation.—Take of the root of *Hydrastis Canadensis*, in coarse powder, one hundred pounds, and add of alcohol a sufficient quantity to form a tincture by percolation; and distil off the alcohol; the residuum, which is of a thick, syrupy consistence, must be warmed, and poured into eight gallons of hot water, which will take up the hydrastin, with a portion of gum, extractive, and some coloring matter. Let it stand for two or three days, and then decant into a precipitating tub, and add of muriatic acid five pounds. This causes a precipitate, which, when perfected, must be collected on a linen or cotton cloth placed over a tub for the purpose, and washed well by pouring clean water upon it. When it has thoroughly drained, place it into a tin boiler, and add of animal charcoal three pounds, and alcohol, six or eight gallons; place this over a strong heat, and stir constantly till it is all dissolved, bringing the liquid to the boiling point; then set it aside, and as it cools the crystals will form on the sides of the boiler and through the alcohol, and will continue to form for two or three days. The liquid and crystals must then be placed on a cloth, as before, being careful not to dip up the charcoal which is in the bottom of the vessel, and wash the crystals with cold alcohol, after which spread them on a cloth or paper and dry in the open air, or by moderate heat, if necessary. If they are not of the proper color, redissolve them in alcohol with animal charcoal, and proceed as at first. For the purpose of obtaining any remaining hydrastin, the alcohol in which it crystallizes may be distilled and carried through the same process as at first; and the mother water may be treated with ammonia, and the precipitate purified in the same manner as at first.

The following is Dr. A. R. Brown's process for obtaining hydrastin: "Macerate thirty pounds of the roots of Golden Seal in eight gallons of Alcohol 76 per cent., for forty-eight hours; then, through a small opening made in the bottom of the vessel containing the above, allow the tincture to run off into a separate vessel; add of a new supply of alcohol four gallons, and after macerating for twenty-four hours, draw off as before. Now, pour upon the roots, six gallons of cold water, and in twenty-four hours draw off the remaining alcohol, the water having been absorbed by the roots. Place these several tinctures together into a displacement apparatus sufficiently large for the purpose, (I prefer Smith's) and distil off the alcohol. Remove the residue, and let it stand an hour or two; and then pour off the supernatant liquid very carefully, so as to leave behind a black oleo-resinous substance, which if not removed will injure the beautiful yellow color of the hydrastin, and prevent it from being pulverizable. Now treat the liquid which has been

poured off, with six or eight gallons of water, and while stirring the whole, gradually add of pure muriatic acid, sixteen ounces; let it stand ten or twelve hours, and filter through very fine muslin. Remove the hydrastin and place it on unglazed dishes to facilitate its drying. As prepared by this process, one pound of the roots yields half an ounce of the so-called hydrastin."

History.—This elegant and highly valuable article was introduced to the profession by Dr. H. H. Hill of the firm of F. D. Hill & Co., wholesale druggists in Cincinnati. I feel highly indebted to these gentlemen for the above description of the process employed by them for its manufacture, and would take this occasion to remark, that I regret the spirit of selfishness which prompts some manufacturers to withhold a knowledge of their mode of preparing concentrated articles; it is a species of empiricism which should never be countenanced by any physician. I never employ an article of any kind, unless its mode of preparation is known to the profession, and this course should be adopted by every practitioner, as one among the many other means of elevating the profession, and securing the confidence of others, as well as of ourselves. It is but a short time, since I was presented with a concentrated agent obtained by precipitation with acetate of lead, and on an investigation I found some lead mixed with it, and which, had I administered without a knowledge of the process employed for obtaining it, and my consequent examination, might have caused serious results. In this instance the proper course had not been taken to free the article from the lead. The profession, therefore, cannot be too uncompromising in refusing to administer agents, however valuable they may be, which are manufactured by secret processes.

Hydrastin prepared by the above process, forms in delicate, acicular crystals, of a yellow color and translucent. It exhibits neither acid nor alkaline reactions, and forms when pulverized a beautiful yellow powder. It is soluble in boiling alcohol, but is deposited as it cools in crystals. It is insoluble in cold alcohol, ether, chloroform, spirits of turpentine, and water, though each liquid becomes tinged more or less of a yellow color. It is rendered more soluble in alcohol, but not completely so, by ammonia, liquor potassa, or acetic acid, the last article making the solution of a lighter color. It dissolves to a greater extent in water by the addition of acetic acid, which changes the solution to a light-yellow color; ammonia or liquor potassa does not make it more soluble in water, and nitric acid changes the hydrastin to a beautiful bright-yellow color, without solution—sulphuric acid to a chrome-yellow. Concentrated nitric acid turns hydrastin red, and concentrated sulphuric acid swells or effervesces and changes it to a chrome-yellow color. Heat gradually changes the color to a brownish-red, and then black with effervescence. At its point of effervescence by the application of heat, it is inflammable if brought

into contact with flame, burns quickly, and leaves a black, porous, shining substance behind.

The hydrastin prepared by the Franklin Pharmaceutical Institute of the city of New York, is said to be soluble in water; as I have not seen the article, nor been able to obtain an account of its mode of preparation, I can merely refer to the fact that such an article is advertised. Soluble preparations of the concentrated principles of many of our agents are certainly very desirable, on account of the difference of therapeutic action existing between them and a decoction, infusion, or tincture of the crude articles; thus, a decoction of golden seal exerts an influence in sore mouth, and several other affections, not to be obtained from the insoluble hydrastin. These facts should be especially observed.

Properties and Uses.—Hydrastin is a tonic, with an especial action on diseased mucous tissues; it possesses, in an eminent degree, the tonic virtues of the root, and is much used as a substitute for it. It is more beneficial as a tonic during convalescence from exhausting diseases, such as, bilious and typhoid fever, acute hepatitis, gastritis, enteritis, diarrhea, dysentery, etc. In dyspepsia, and chronic inflammation of the stomach it is very valuable, and will be found of especial advantage in the treatment of persons who are intemperate, gradually removing the abnormal condition of the stomach, and in many instances destroying the appetite for liquor—it may be combined in these cases with sulphate of quinia, extract of quassia, or other bitter tonic. In jaundice a combination of equal parts of hydrastin, myricin, and xanthoxylin, will often prove efficacious. Combined with Quinia and Leptandrin, it will be found useful in infantile remittent fever. One part of Hydrastin, and two of fine salt, well triturated together, form an excellent powder for many ophthalmic diseases, to be blown into the eyes through a quill or small tube. Equal parts of hydrastin, caulophyllin, and leptandrin, form an excellent medicine for aphthæ, and other ulcerations of the mouth and throat, in infants as well as adults, it should be administered internally. A pill composed of one grain of hydrastin, one-twentieth of a grain of alcoholic extract of Nux-vomica, and sufficient ptelein to form a pill mass, is found an efficacious remedy for some forms of dyspepsia, and loss of appetite; one pill to be given for a dose, and repeated three times a day. Dose of hydrastin, for an adult, from three to five grains; for children from half a grain to three grains, and which may be repeated from three to six times a day, if required.

HYOSCYAMUS NIGER.

Henbane.

Nat. Ord.—Solanaceæ.—*Ser. Syst.*—Pentandria Monogynia.

THE LEAVES AND SEEDS.

Description.—Henbane is a biennial plant, with a fusiform, long, thick, wrinkled, fleshy and somewhat branching root, brown externally, and

whitish within. The *stem*, which rises in the second year, is erect, branched, woody, cylindrical, closely covered with long weak hairs tipped with a minute black gland, thickly furnished with leaves, and growing from one to four feet in height. The *leaves* are large, oblong, acute, alternate, coarsely and unequally sinuated, sessile, occasionally somewhat decurrent, stem-clasping at the base, pale dull-green, slightly pubescent, with long glandular hairs upon the midrib. The *flowers* are numerous, nearly sessile, of a straw-yellow color, marked with purple veins, and arise singly either from the axilla of the leaves, or from long, nodding, secund spikes, at the end of the branches and stem. The *corolla* is monopetalous, funnel-shaped, with a somewhat erect limb, which is divided above into five rounded lobes, the two anterior of which are a little smaller than the others, and separated at base by a deep slit in the tube. The *calyx* is villous, funnel-shaped, five-lobed, regular, wider than the corolla, to whose tube it is equal in length and persistent; each *lobe* ovate, acute, with an open æstivation. *Stamens* five, declinate, straight, shorter than the corolla, the three lower longer than the others; *filaments* pubescent, inserted about the middle of the tube of the corolla, inclined, and bearing cordate, purple anthers. The ovary is nearly round, shining, pale-green, two-celled, with numerous ovules adhering to the dissepiment; *style* filiform, declinate, having a blunt, round stigma. The *fruit* or *capsule* is ovate, bilocular, and opening by a convex lid; it contains numerous small, obovate, unequal, brown seeds. The whole plant has a rank, offensive smell, and a forbidding appearance.

History.—Henbane is a native of Europe, and is naturalized in the northern parts of the United States, flowering in July and August. Botanists are divided as to whether it is an annual or biennial plant, as it is sometimes found to be the former. The biennial is the officinal plant, though we are not aware of any difference between the two as regards medical properties. All parts of the plant are medicinal, but the leaves and seeds are the parts usually employed; the former should be gathered at the time of its full inflorescence, and the latter when perfectly matured. The leaves of the second year's growth of the officinal plant are more active than those of the first year; when fresh they abound in a viscid juice, and when bruised have a strong, fetid, narcotic odor, with a mucilaginous, unpleasant, and somewhat acrid taste.

Upon drying most of these qualities are lost. The leaves impart their properties completely to diluted alcohol; water, alcohol, ether, fixed or volatile oils, also take up a portion of their virtues. The aqueous infusion is pale-yellow, insipid, with a narcotic odor. By destructive distillation, the leaves yield a very poisonous empyreumatic oil. The seeds are of a yellowish-gray or brown color, with the odor of the plant, and an oleaginous, bitter taste; they are very small, roundish,

compressed, somewhat reniform, and a little wrinkled. They contain fixed oil, fatty matter, gum, bassorin, starch, albumen, vegetable fiber, saline matters, with *hyoscyamia*, etc.

Hyoscyamia is the active principle of henbane ; it may be obtained by exhausting the seeds first with alcohol, and then with hot water—concentrating the united liquids by a very gentle heat, and decolorizing them by the alternate use of lime and sulphuric acid, with filtration after each addition, and then still further concentrating by evaporation with gentle heat ; the product is now to be decomposed by adding an excess of powdered carbonate of soda, and the precipitate produced is separated as speedily as possible, from the alkaline carbonate by expressing, and treated with absolute alcohol ; while the mother waters are treated at the same time with sulphuric ether. The alcoholic and ethereal liquors are united, and again treated with lime, filtered, decolorized with animal charcoal, and evaporated by a very gentle heat. If the hyoscyamia deposited should be colored, it must be combined with an acid, and the whole process repeated from the addition of carbonate of soda onward. The quantity obtained is small. Hyoscyamia crystallizes in tufts of colorless, transparent, silky needles, which are inodorous, of an acrid, disagreeable taste, slightly soluble in water, very soluble in alcohol and ether, and volatilizable with little change if carefully distilled. If boiled in contact with water and an alkali, it is quickly decomposed, with evolution of ammonia. It neutralizes acids, forming with them crystallizable salts. The tincture or infusion of galls precipitates it from its solutions. Hyoscyamia is an active poison, as are its salts ; a minute quantity of it placed within the eye, produces a persistent dilatation of the pupil. In its natural state of combination, this principle is very prone to decomposition under the influence of heat, and its destruction is always indicated by the escape of ammonia.

Properties and Uses.—In large doses, henbane is a powerful narcotic, and dangerously poisonous ; it powerfully affects the brain, as well as the alimentary canal, occasioning dilatation of the pupils, disordered vision, loss of speech, stupor or delirium, convulsions, paralysis, pain in the bowels, diarrhea, great arterial prostration, petechiæ, and other alarming symptoms, which sometimes end in death. Inflammation of the stomach and bowels are found on dissection. Emetics and the stomach pump, stimulants, galvanism and acids are the chief remedies in such cases. In medicinal doses, it is anodyne hypnotic, calmative, and antispasmodic ; allaying pain, soothing excitability, inducing sleep, and arresting spasm. It does not produce constipation like opium, but has a tendency to act as a laxative. Usually given in cases where opium disagrees, or where constipation must be avoided ; in neuralgic and all spasmodic affections, asthma, gout, rheumatism, chronic cough, irritations of the urinary organs, and inflammatory cases attended with nervous excitability and

not with high fever. It may be combined with active cathartics, as scammony, colocynth, aloës, podophyllin, etc., for preventing tormina without impairing their energy. Its principal employment is to cause sleep, or remove irregular nervous action. Where the fresh leaves can be obtained, they are employed in fomentation, or bruised as an external application to allay pain and irritation of tumors, ulcers, nervous headache, gouty, rheumatic, and neuralgic pains, and similar affections. An infusion of the leaves, or a solution of the extract is dropped into the eye by oculists, previous to the operation for cataract, in order to dilate the pupil, which it usually effects in three or four hours, without any subsequent injury to the eye. One part of hyoseyamia to twenty-four of water, forms a solution for a similar purpose, and of which one drop is to be placed on the eye. Dose of the powdered leaves from five to ten grains; of the tincture from thirty drops to two fluidrachms; and of the alcoholic extract, which is the only extract that should be used, from one-half of a grain to two grains, which may be increased gradually to twenty.

Off. Prep.—Extractum Hyoseyami Alcoholicum; Extractum Hyoseyami Fluidum; Tinctura Hyoseyami.

HYPERICUM PERFORATUM.

St. John's Wort.

Nat. Ord.—Hypericaceæ. *Sex. Syst.*—Polyandria Pentagynia.

THE TOPS AND FLOWERS.

Description.—This plant has a perennial, woody, tufted, fusiform, tortuous, somewhat creeping root. The stem is ancipital, branchiate, erect above, curved below, much branched, and from one to two feet high. The leaves are very numerous, elliptical or ovate, obtuse, conspicuously marked with numerous pellucid dots, of a light green color, from six to ten lines long, and one third as wide, the ramial leaves being much smaller. The flowers are numerous, of a bright yellow color, and arranged in dense, forked, terminal panicles. The calyx is persistent, and is composed of five acute-lanceolate sepals, united at base, and bordered with fine dark-colored glands. The corolla consists of five ovate, obtuse, sessile petals, much longer than the sepals, of a yellow color, with numerous dark glandular spots at the edges. The stamens are numerous, united at base, and divided into three sets, with small anthers. The styles are three, short, erect, with very small stigmas. The fruit or capsule is somewhat globose, with three cells, and opening naturally by three valves; seeds numerous, small, roundish. The whole herb is dark-green, with a powerful scent when rubbed, staining the fingers with dark purple, from the great abundance of colored essential oil.

History.—St. John's Wort is an herb abundantly growing in this country and Europe, and proving exceedingly troublesome to farmers. The flowers appear from June to August. It has a peculiar balsamic odor, and a bitter, resinous, somewhat astringent taste. It contains a volatile oil, a resinous substance, tannin and coloring matter. It imparts its properties to water, alcohol, ether, oils, or alkaline solutions.

Properties and Uses.—Astringent, sedative, and diuretic. Used in suppression of the urine, chronic urinary affections, in diarrhea, dysentery, worms, jaundice, menorrhagia, hysteria, nervous affections with depression, hemoptysis, and other hemorrhages. Externally, in fomentation, or used as an ointment for dispelling hard tumors, caked breasts, bruises, ecchymosis, swellings, ulcers, etc. The blossoms infused in sweet oil or bear's oil, by means of exposure to the sun, make a fine red balsamic ointment for wounds, ulcers, swellings, tumors, etc. Dose of the powder, from half a drachm to two drachms; of the infusion, from one to two fluidounces.

Off. Prep.—Infusum Hyperici.

HYSSOPUS OFFICINALIS.

Hyssop.

Nat. Ord.—Labiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE TOPS AND LEAVES.

Description.—Hyssop is a perennial plant, with numerous, erect, quadrangular, spreading, and much branched *stems*, which are woody at their base, and about two feet high; the *branches* are rod-like, and one or two feet long. The *leaves* are opposite, sessile, usually oblong-linear, or lanceolate, sometimes elliptical, sometimes narrower, acute, entire, punctate, green on each side, rather thick, one-ribbed underneath. The *flowers* are violet-colored or blue, sometimes white, chiefly one-sided, and arranged in half verticillated, terminal, leafy spikes. *Floral leaves* like those of the stem but smaller. *Outer bracts* lanceolate-linear, acute, scarcely shorter than the calyx. The *upper lip of the corolla* is roundish, and emarginate, the lower is divided into three segments, of which the undermost is obovate. *Stamens* four. *Calyx teeth* erect.

History.—This plant is a native of Europe, and is cultivated in the gardens of that country as well as in those of the United States; it flowers in July. The tops and leaves are the parts used; they have an agreeable odor, and a warm, pungent, bitterish taste, and owe their properties to a volatile oil, which may be obtained separate by distillation with water. Water by infusion or alcohol extracts its active virtues. Said to contain beside its yellow oil, some bitter principles, and sulphur.

Properties and Uses.—Stimulant, aromatic, carminative and tonic. Principally used in quinsy and other sore-throats, as a gargle, combined with sage and alum, in infusion sweetened with honey. Also recommended in asthma, coughs, and other affections of the chest, as an expectorant. The leaves applied to bruises, speedily relieve the pain, and disperse every spot or mark from the part affected.

Off. Prep.—Infusum Hyssopi.

IBERIS AMARA.

Bitter Candytuft.

Nat. Ord.—Brassicaceæ. *Sex. Syst.*—Tetradynamia Siliculosa.

THE SEEDS.

Description.—This plant has a herbaceous stem, about a foot in height, with lanceolate, acute, somewhat toothed leaves, and white flowers, corymbed, but becoming racemed. *Silicles* obcordate, narrowly emarginate.

History.—This is a small annual plant, indigenous in Europe, where it is cultivated in gardens, on account of its bright milk-white flowers, which appear in June and July. The leaves, stem, and root, are said to possess medicinal properties; but the seeds are the most efficacious. The ancients employed it in rheumatism, gout and other diseases.

Properties and Uses.—In large doses it produces giddiness, nausea, and diarrhea; but its virtues do not seem to be associated with any perceptible physiological effect. It is thought to exercise a happy influence over the excited actions of the heart, and is especially useful in hypertrophy. Much advantage is also said to have accrued from it in asthma, bronchitis and dropsy. The dose of the seeds is from one to three grains.

ICHTHYOCOLLA.

Isinglass.

THE SWIMMING BLADDER OF ACIPENSER HUSO, AND OTHER SPECIES OF ACIPENSER.

History.—In the greater part of fishes, there is a membranous bag placed in the anterior part of the abdomen, frequently communicating by means of a duct, with the esophagus or stomach, and which is termed "sound," or "swimming bladder," from the idea that its contraction or expansion enables the fish to sink or rise in the water. Its shape varies among fishes, and it is composed of two inner, thin and delicate coats, and one external, tough and silvery white. These are removed from the fish while fresh and sweet, split open, cleansed from any impurities by careful washing, divested of their mucous coat, and spread

out to dry or stiffen in the air. They are then formed into cylindrical rolls about as thick as the finger, and bent into the shape of horse-shoes, by bringing the ends together, which are secured by pegs. The longer rolls are called *Long-staple*, and the shorter, *Short-staple*. These rolls are known in commerce as *Staple Isinglass*. Sometimes the sounds are dried in a flat state, or simply folded, and then receive the name of *Leaf* or *Book Isinglass*. These are the best kinds, but the finest book isinglass is superior to any; one hundred grains of it dissolve in ten ounces of water, forming a tremulous jelly when cold, and yield but two grains of membranous insoluble residuum.

There are other kinds of an inferior character, as the *Cake Isinglass*, which is in cakes or globular masses, brownish, of an unpleasant odor, and used only in the arts. A Russian product of an inferior character, which comes in the form of *Leaf*, *Book*, and *Short-staple*, and termed *Samovey Isinglass*, is said to be prepared from the *Silurus Glanis*. Isinglass is also made in New England from the intestines of the codfish (*Morrhua Americana*), and some of its allied fishes; this sort is in ribbons, several feet in length, and from one to two inches in width; although pure, yet its fishy taste and odor render it unfit for culinary and medicinal purposes. Fifty grains of this dissolve in four ounces of water, and form a tremulous jelly on cooling, leaving but one grain of insoluble membrane. Isinglass is also prepared in Brazil and the East Indies, but is inferior in quality.

Refined or *transparent isinglass* is made by dissolving the New England isinglass in hot water, and spreading the solution to dry on oiled muslin. It is in very thin plates, and is an excellent glue, but retains a fishy odor. *Cooper's Gelatin* appears to be the dried froth of a solution of pure bone-glue.

Isinglass is the purest form of gelatin with which we are acquainted; it is whitish, semi-transparent, of a shining, pearly appearance, inodorous, and tasteless when pure. It is insoluble in alcohol, but is readily dissolved by most dilute acids and alkaline solutions. It swells up and softens in cold water, but does not dissolve; boiling water wholly dissolves it, with the exception of any impurities, forming on cooling a jelly of pure gelatin and water. Its aqueous solution speedily putrefies. With tannin it forms an insoluble compound, somewhat like leather. Boiled with concentrated sulphuric acid, it is converted into a kind of sugar, termed *Glycocoll*, or *Sugar of Gelatin*. The inferior kinds of isinglass are yellowish and more opaque than the better kinds. Analysis has found in isinglass a large quantity of gelatin, some albumen, osmazome, insoluble membrane in boiling water, free acid, various salts and water.

An excellent cement, called *Armenian* or *Diamond Cement* is made with isinglass, which is valuable to the chemist and pharmacist for mending glass, china and porcelain vessels, which are not exposed to heat and moisture. It is made by sprinkling water upon two drachms

of isinglass, allowing it to stand until softened, then adding as much proof spirit as will rather more than cover it, and dissolving it with a moderate heat. Have previously prepared, a solution made by dissolving one drachm of gum mastic, in two or three fluidrachms of alcohol. Mix the two solutions, and stir in one drachm of gum ammoniacum, previously reduced to a fine powder, and rubbed down with a little water. Evaporate, if necessary, in a water-bath to a proper consistence. Keep the cement thus prepared in a vial. When required for use plunge the bottle in warm water, and keep it there until the cement becomes fluid; then apply it with a stick or small hard brush to the edges of the broken vessel, previously warmed. Compress the pieces firmly together until cold, taking care to make the contact perfect, and using a very thin layer of cement; when properly applied, the cement is almost, if not quite, as strong as the glass or china itself.

A cement for stoneware may be made by allowing gelatin to swell in cold water, the jelly warmed, and so much recently slaked lime added as is requisite to render the mass sufficiently thick for the purpose. A thin coating of this cement is spread while warm over the gently heated surfaces of fracture of the articles, and let dry under a strong pressure. What oozes out is removed directly with a moist rag.

Isinglass is sometimes kept cut up in fine shreds, in which form it is more readily acted on by boiling water.

Properties and Uses.—Isinglass is seldom used in medicine except as a nutritive. It is used as a diet, in the form of jelly, or added to other jellies, to give them a tremulous appearance. I have used the following preparation in incontinence of urine, both in children and adults, in many instances, and have found it as useful as well as agreeable remedy, proving serviceable when other means had failed: Take of isinglass (*long staple*) one roll; boil it in one pint of water till it is dissolved, then strain, add one pint of sweet milk, put it again over the fire, and remove it just as ebullition commences; then sweeten with loaf sugar, and grate nutmeg upon it. When made, it very much resembles custard. Of this, a tumblerful may be taken three or four times a day by an adult.

Isinglass is employed in the arts for various purposes, and is often added to vegetable jellies for the purpose of giving them a tremulous appearance. Three drachms form a proper jelly with a pint of water.

ILEX OPACA.

American Holly.

Nat. Ord.—Aquifoliaceæ. *Ser. Syst.*—Tetrandria Tetragynia.

THE LEAVES.

Description.—This tree rises from twenty to forty feet in height, having leaves which are alternate, coriaceous, evergreen, smooth and shining,

flat, oval, acute at the end, and the wavy margins armed with strong, scattered spiny teeth. The *flowers* are small, greenish-white, and are arranged in scattered clusters along the base of the young branches, and from the axils of the leaves. The *calyx* is persistent; *calyx-teeth* acute. The *corolla* is rotate, monopetalous, four-cleft; *stamens* erect, and alternate with the divisions. The *ovary* is globular, four-celled, with four sessile stigmas. The *fruit* is globular, umbilicated at top, fleshy, scarlet, and contains four bony nuckles.

History.—The Holly is found growing throughout the United States from Maine to Louisiana, in moist woodlands, and flowering in June. It is quite common to the Atlantic States, especially New Jersey. The leaves are the medicinal parts; they have a bitter, somewhat austere taste, but no odor, and yield their virtues to water or alcohol. They are said to contain *ilicin*, wax, gum, several salts, etc. *Ilicin* is the bitter principle upon which the febrifuge virtues of the leaves depend; it may be obtained by diluting a strong alcoholic extract of the holly leaves with water, to which add sugar of lead, then sulphuric acid, and finally carbonate of lime. The *ilicin* being thus separated, dissolve it in alcohol; then evaporate to a syrupy consistence. Or, a filtered decoction of the leaves may be boiled with animal charcoal, then allow the charcoal to subside, wash it, treat it with alcohol, filter off the alcoholic solution, and evaporate to a syrupy consistence. The liquid thus obtained is very bitter, and when allowed to evaporate spontaneously, yields an amorphous substance, resembling gelatin, which is *ilicin*. It is not soluble in ether, partially dissolves in warm water, soluble in alcohol, and is not decomposed by acids or alkalies. Two pounds of the dried leaves yield more than two ounces of this principle. The inner bark of the holly is glutinous, and the viscous substance called *birdlime* is prepared from it, by burying it in the earth for some days, in order to soften it, it is then beaten in a mortar, and well washed in water to separate the impurities. The berries are about the size of a pea, red, with a bitter, acrid taste.

Properties and Uses.—Holly leaves are tonic and febrifuge; said to be very efficacious in the treatment of intermittent fever, used in doses of a drachm of the powder two hours before the paroxysm. The infusion has likewise proved beneficial in catarrh, jaundice, pleurisy, small-pox, gout, etc. Ten or twelve of the berries, are said to be emetocathartic, producing copious watery evacuations.

Ilicin, as well as the holly leaves, exerts a sedative influence on the spleen, liver, and pancreas, and is a cheap substitute for quinia. The dose of *ilicin* for an adult, as a febrifuge or antiperiodic, is twelve grains gradually increased to twenty-four, and given in the form of pill.

The European Holly, *Ilex Aquifolium*, together with several other species in this country, possesses similar properties. The *Ilex Vomitoria*

or South Sea tea, an evergreen shrub growing in our Southern States, is the *Cassina* of the Indians. They toast its leaves and make a decoction, called *Black drink*, which is used in their religious ceremonies and great councils, by the men only, to purge their bodies from impurities. The leaves are inodorous, with an aromatic, acrid taste. A decoction of them in small doses, acts as a powerful diuretic; in large doses it produces copious evacuations from the stomach, bowels, and bladder. The inhabitants of North Carolina, on the sea coast, modify the deleterious action of their brackish water, by boiling a few leaves of *Cassina* with it. These plants are deserving a careful investigation.

IMPATIENS PALLIDA.

Jewelweed.

Nat. Ord.—Balsaminaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE HERB.

Description.—*Impatiens Pallida*, likewise known by the names of *Pale Touch-me-not*, *Balsam-weed*, etc., is an indigenous annual plant, having a smooth, succulent, tender, subpellucid, branching stem, with tumid joints, and growing from two to four feet in height. The leaves are oblong-ovate, coarsely and obtusely serrate, teeth mucronate, from two to five inches long, petiolate, and about two-thirds as wide. The flowers are large, pale-yellow, sparingly maculate, mostly in pairs; peduncles two to four-flowered, elongated. Sepals apparently but four, the two upper united, the lowest gibbous, dilated-conical, broader than long, with a very short, recurved spur. Petals apparently two, unequal-sided and two-lobed, each consisting of a pair united. Stamens five, short; anthers opening on the inner face, connivent over the stigma. Ovary five-celled; stigma sessile. Capsules oblong-cylindric, an inch long, five-valved, bursting at the slightest touch when ripe and scattering the anatropous seeds.

IMPATIENS FULVA, or *Speckled Jewels* is the most common variety; its leaves are rhombic-ovate, obtusish, coarsely and obtusely serrate, teeth mucronate. The flowers are smaller than in the previous one, deep orange, and maculate with many brown spots; lower gibbous sepals acutely conical, longer than broad, with an elongated, recurved spur.

IMPATIENS BALSAMINA, the *Garden Balsam* or *Ladies' Slippers*, is spontaneous about gardens; its leaves are lanceolate, serrate, upper ones alternate; peduncles clustered, one flowered; spur shorter than the flowers. The flowers are red, white, purple, pink, flesh-color, and scarlet; sometimes they are double. This is an exotic plant, a native of the East Indies, and cultivated as a beautiful garden annual. Its height is from one to five feet.

History.—These plants grow throughout the United States, in moist shady places, and along rills, in rich soil, flowering from July to September. The *I. Pallida* is most common northward and westward and the *I. Fulva*, southward. They all possess similar properties. The whole plants are used, and impart their virtues to water.

Properties and Uses.—They are aperient and diuretic; a decoction is recommended in jaundice, hepatitis and dropsy. The juice is said to remove warts, cure ringworms, salt-rheum, etc., and to cleanse foul ulcers; or it may be applied for these purposes in the form of a poultice boiled in milk. The recent plant boiled in lard, forms an excellent ointment for piles.

INULA HELENIUM.

Elecampane.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE ROOT.

Description.—Elecampane has a thick, fusiform, branching, aromatic, and perennial root, with a thick, leafy, round, furrowed, solid stem, from four to six feet high, and branched and downy above. The leaves are large, ovate, serrated, veiny, smooth and of a dark-green color above, downy and hoary beneath with a fleshy midrib; the radical ones are petiolated, from one to three feet in length, by six or twelve inches wide; the cauline ones sessile, amplexicaul. The flower-heads are large, radiated, solitary at the downy summits of the branches, two inches broad, and of a bright-yellow color. The involucre is hemispherical; the outer scales are broad, recurved, leafy, finely downy on both sides; the inner scales are narrow, linear, and chaffy. The florets of the ray are numerous, spreading, linear, ligulate, pistillate, and terminate in three unequal teeth; the disk-florets are numerous, perfect, tubular, five-cleft. The anthers are furnished with bristles at their base; the ovary is oblong with a filiform cloven style, and spreading, obtuse stigmas. The seeds are quadrangular, smooth, striated, and furnished with a simple, roughish pappus.

History.—Elecampane is a native of Europe and Japan, and is naturalized in some parts of the United States, growing in moist places, and about houses, flowering in July and August. The root is the officinal part, and should be gathered in autumn, and in the second year of its growth. When fresh it is very thick, spindle-shaped, much branched, with whitish cylindrical ramifications furnished with thread-like fibers; brown externally, and whitish and fleshy internally. As found in the shops in the dried state, it is usually in longitudinal or transverse slices, and of a grayish color internally. It has an agreeably aromatic, somewhat camphorous smell, and a warm, aromatic, bitter taste. It yields

its properties to alcohol or water, but more especially to the former. Analysis has found in it, a volatile oil, a peculiar camphor, wax, acrid resin, gum, bitter extractive, inulin, etc. *Inulin* is an amylaceous substance, differing from starch in being deposited unchanged from its solution in boiling water, as the liquid cools, and in giving a yellowish instead of a blue color with iodine. Its constitution is identical with that of starch, and it has been found in the roots of many other plants. Beside this principle, elecampane contains another, called *Helenin*, which is intermediate in its properties between the essential oils and camphor, and is separable by distillation with water. *Helenin* may be obtained by cutting the fresh root of elecampane in slices, and exhausting with boiling alcohol of sp. gr. 0.833; the hot solution is to be filtered, and mixed with three or four times its bulk of cold water, when a slight turbidness results, and after standing twenty-four hours, long, dazzling white needles of pure helenin will be found in the liquid, leaving very little in solution. The dried root gives a smaller quantity of this principle than the fresh.

Inulin may be had by boiling the roots in water, and concentrating the decoction by evaporation; it is deposited as a brittle white mass, formed of crystalline grains, or as a fine, tasteless powder.

Properties and Uses.—Elecampane is an aromatic stimulant and tonic, and is said to possess diaphoretic, diuretic, expectorant, and emmenagogue properties. It is much used in chronic pulmonary affections, weakness of the digestive organs, hepatic torpor, dyspepsia, and internally and externally in tetter, itch, and other cutaneous diseases. When added to the Compound Syrup of Spikenard, it should be exhausted by boiling alcohol, and the tincture added to the syrup, instead of boiling it with the other articles, as is usually done. The alcoholic extract, combined with powdered extract of liquorice, benzoic acid, sanguinarina, and morphia, forms a lozenge or pill very valuable in chronic catarrhal, bronchial, and all pulmonary irritations; one drop of the Oil of Stillingia may be added to each lozenge, for bronchial and laryngeal affections. Dose of the powder, from one scruple to one drachm; of the infusion, from one to two fluidounces.

Off. Prep.—Decoctum Helenii; Extractum Helenii Hydro-alcoholicum; Syrupus Araliæ Compositus.

IODINUM.

Iodine.

Preparation.—*Kelp*, which contains about a 224th part of Iodine, is lixiviated in water, in which about one-half dissolves. The solution is concentrated to a pellicle, and allowed to cool, whereby all the salts, except the Iodide of Sodium, are almost completely separated, they

being less soluble than the iodide. The remaining liquor, which is dense and dark-colored, is rendered sour by sulphuric acid, whereby carbonic acid, sulphureted hydrogen, and sulphurous acid are evolved, and sulphur is deposited. The liquor is now introduced into a leaden still, and distilled with a portion of deutoxide of manganese into a series of glass receivers, inserted into one another, in which the iodine is condensed. In this process the iodide of sodium is decomposed, and the iodine evolved; and the sulphuric acid, deutoxide of manganese, and sodium unite, so as to form the sulphate of protoxide of manganese and sulphate of soda.

Souberain states that a much larger quantity of iodine may be obtained by the following process: Add sulphate of copper to the mother water so long as a white precipitate of iodide of copper is thrown down. Then treat the supernatant liquid with more of the sulphate, together with iron-filings. The iron, taking the place of the copper in the solution, sets that metal free; and the metal, in the act of evolution, unites with what remains of the iodine in the fluid, so that more iodide of copper is formed. When this iodide is mingled with oxide of manganese and sulphuric acid, a moderate heat decomposes it, and iodine is sublimed.

History.—Iodine is an elementary non-metallic body, discovered in 1812 by Courtois, a French soda manufacturer; and in 1820, its medicinal virtues were first made known by Dr. Coindet, sen., of Geneva. It exists in many marine vegetables, particularly the fuci or common seaweeds, and is also found in nitre, sponge, sea-water, oyster, cod-liver oil, water-cress, brook-lime, fine-leaved water hemlock, coal-gas, many ores, salt-springs, spring-waters, etc. Sea-weeds, however, contain it in the greatest proportion; they are burned for the sake of their ashes, the product being a dark-colored fused mass called *Kelp*.

Iodine is a soft, friable, opaque substance, in the form of crystalline scales, or in solid masses, of a shining appearance, and bluish-black color. It emits a peculiar, powerful odor, which strongly irritates the nostrils, and excites cough, has a hot, acrid taste, and is brittle and pulverizable. It stains the skin brownish-yellow, and if the contact be prolonged, will destroy the soft textures of the body. It is volatile, and slowly evaporates at common temperatures; when heated it evaporates more rapidly, fuses at 245° , and boils at 347° , distilling over in the form of a rich purple vapor, which condenses into scales. Water dissolves only a 7,000th of its own weight of iodine, and acquires a brownish-yellow color; in saline solutions it is much more soluble, and freely so in solutions of chloride of sodium, nitrate of ammonia, or iodide of potassium. It dissolves in twelve parts of rectified spirit at 60° , is very soluble in ether, or the volatile oils, but with some of them, especially those from coniferous vegetables, considerable heat is evolved, brisk

effervescence ensues, and much of the iodine is discharged in vapor. It unites with oxygen or hydrogen to form acids; also with sulphur, phosphorus, carbon, chlorine, etc.; starch globules, if converted by boiling with water into soluble starch or amidin, form a blue precipitate with it, of such intensity that iodine may be detected in 450,000 parts of water. To effect this the iodine must be free, which may be obtained by adding a little nitric acid to the suspected solutions, and the solutions must be cold. Iodine is easily mixed with fatty substances; it is apt to escape from the surface of ointments, unless united with iodide of potassium, which much impedes this result. The combination of iodine with hydrogen forms a gaseous acid, called *Hydriodic Acid*: and that with oxygen forms three acids, the *Iodous*, *Iodic*, and *Hyperiodic Acids*. Starch is a delicate test to determine the presence of iodine in urine, solutions, etc. Chloroform has been recently proposed as a test; thus, if 150 grains of a solution containing one part of iodide of potassium in one hundred thousand of its weight, be treated with two drops of nitric and fifteen or twenty drops of sulphuric acid, and afterward shaken with fifteen grains of chloroform, the latter acquires a distinct violet tint. Chloroform may also be applied to the detection of iodine in the several varieties of cod-liver oil, the amount of which may be judged by the depth of color produced; as follows: Incinerate in an iron spoon 50 parts of the specimen of the oil with 5 of caustic potassa, dissolved in 15 of water, and exhaust the cinder with the smallest possible quantity of water. Filter the solution, acidulate it with nitric and sulphuric acids, and agitate with four parts of chloroform. After a time, the chloroform is deposited of a violet color, more or less deep according to the amount of iodine present. This test of iodine was presented by M. Rabourdin. Dr. A. Overbeck gives the following very delicate test for iodine: Some starch or sugar is poured into a test-tube with concentrated nitric acid, and heated over a spirit-lamp very gently until a violent evolution of gas ensues. The spirit-lamp is then removed, and the gas, which now evolves without a continuation of the application of heat, is conducted into the fluid to be tested, to which a solution of starch has been added. If the fluid contains only a millionth of iodide of potassium, a blue coloration directly results. By a farther introduction of the gas, the iodide of starch precipitates out in flocks, and deposits itself, when at rest, as a compact, massy precipitate. In this way he found iodine in many plants, particularly in the ashes of several ranunculuses. There are so many substances *incompatible* with iodine, that its preparations are best given in simple water sweetened, and diluted to the patient's taste.

Iodine is much subject to adulteration: oxide of manganese, charcoal, plumbago, red oxide of iron, and the like, are often fraudulently added to it. The most frequent adulteration, however, is water, which may be easily detected by the presence of visible moisture in the bottle, or by the iodine adhering to the inside of it. The Edinburgh College

has given a test which detects all impurity beyond two per cent. It is based upon the fact that pure iodine diffused in water, forms a colorless solution of iodide of calcium and iodate of lime, with a certain proportion of quicklime. Accordingly, an amount of quicklime is directed, which is not quite sufficient to form a *colorless* solution with iodine, containing only two per cent. of impurity; and hence, if the sample contain more impurity, the lime is competent to produce a solution without color. The test is: Thirty-nine grains of the iodine suspected, with nine grains of quicklime, and three ounces of water, when heated short of ebullition, slowly form a perfect solution, which is yellowish or brownish if the iodine be pure, but colorless if there be above two per cent. of water or other impurity.

Properties and Uses.—In large doses, Iodine is an irritant and corrosive poison, stimulating the mucous membranes, liver, and absorbent glands, exciting the sexual organs, and producing debility of the digestive functions, muscular weakness, and emaciation. This influence upon the system, in which its poisonous effects are developed, is termed Iodism. Its symptoms are restlessness, palpitation, a sense of constriction in the throat, and of burning along the gullet, excessive thirst, pain and nausea in the stomach, vomiting and purging, severe cramps, diuresis, priapism, rapid and extreme emaciation, and frequent pulse. From four to six grains have produced these symptoms, hence it should never be administered in large doses, and when these effects appear, the medicine should at once be stopped.

In small or medicinal doses, it is a stimulant, tonic, alterative, diuretic, emmenagogue, and diaphoretic. It affects especially the absorbent and glandular systems, and its results vary according to the dose, combination, etc.; it has been detected in the urine soon after being swallowed, also in the saliva, perspiration, milk, and blood, and always in the form of hydriodic acid, or an iodide. It is supposed to undergo conversion in the stomach into hydriodic acid, and thus absorbed. Iodine and some of its preparations will occasionally produce salivation, soreness of the mouth, coryza, and often pustular eruptions. Under its influence, enlarged glands are brought to their normal size, and strumous ulcers gradually healed. Occasionally it has caused a rapid and permanent wasting away of the *mammæ* or testicles; and again after a lapse of time, these organs have recovered their original development.

It is employed medicinally in various forms of disease, in some of which it produces astonishingly beneficial results. The diseases in which it appears to be more generally efficacious, are bronchocele, glandular obstructions, scrofula, syphilis, mercurio-syphilis, strumous ophthalmia, ozæna, ulcers of the integuments, enlargement of the external absorbent glands, chronic enlargement of the liver and spleen, *mammæ*, testes, and uterus, ovarian tumors, leucorrhæa, amenorrhæa, dysmenorrhæa, caries, paralysis, chorea, rheumatism, and in fact all diseases of a hyper-

tropical, strumous or cachectic character. In bronchocele it is most serviceable in the early congestive stage, or in the middle stage of gelatiniform effusion; in the indurated stage of the thyroid gland, it is of little benefit. In this affection its use should be continued uninterruptedly, for at least five weeks, and if no good effects appear, it may be laid aside. It should always be combined with some narcotic, to lessen or prevent its irritant results. The tincture diluted with three times its volume of water, has been recommended as an injection in hydrocele, after removal of the effused fluid, to stimulate the tunica vaginalis, to adhesive inflammation. In erysipelatous inflammations it has been advised to paint the inflamed surface with a strong tincture; likewise in chilblains, and cutaneous scrofula. Iodine is not a cumulative medicine, like lead, digitalis, etc., hence, whenever its effects approach iodism, a suspension of its use will gradually remove them; however, at the present time, these effects are not so often observed as among its early investigators. Yet, as some persons are very susceptible to its influence, the approach of iodism should be carefully watched, and its symptoms checked. In chronic diarrhea and dysentery, cholera-infantum, colliquative diarrhea of phthisis and scrofulous diseases, I have found the following a superior remedy. Take of iodine one and a half grains, sulphate of morphia one-eighth of a grain, geraniin twenty grains—triturate thoroughly together in a mortar, form into a pill mass with simple syrup, or extract of liquorice, and divide into ten pills; of these, one pill may be given every hour or two to an adult. In hepatic and splenic affections, leptandrin may be substituted for the geraniin. In the Mexican diarrhea I succeeded in curing every case in which the following preparation was employed: Take of iodine one and a half grains, tannic acid ten grains, distilled water five fluidrachms; mix together. For an adult, give one fluidrachm, every two hours in syrup of ginger, or cinnamon water; to be continued daily. Externally, iodine is used in the form of ointment for strumous ulcers, ophthalmia, and some cutaneous diseases. A *caustic iodine* is recommended as an application to stimulate or destroy soft and fungous granulations, and as a remedy for noli-me-tangere; it is made by adding an ounce each of iodine and iodide of potassium, to two ounces of distilled water. Iodine is contra-indicated in cerebral congestion, and tendency to apoplexy, in menorrhagia, in disordered stomach or bowels, or wherever local diseases become attended with symptomatic fever, or with incidental febrile affections.

Iodine may be kept in a state of solution when added to mixtures in the form of tincture, by the addition of syrup of orange peel, or a few grains of tannic acid. When given internally to females it is apt to increase the quantity of the menstrual discharge, and sometimes to multiply the periods of its appearance; if the symptoms are not very severe or alarming but little interference will be required, as they will

cease after a short time; where this is demanded, a cessation of the use of the remedy will most generally suffice. In the employment of iodine, if the urine is passed in quantity, and on examination is found to contain iodine, and the strength and appetite of the patient gradually return, it may be considered indicative of a beneficial therapeutical influence, and its use should be continued. Dose of iodine in substance, half a grain, two or three times a day, in pill form; of the tincture from five to fifteen drops, twice a day. The best forms for internal use are the Compound Tincture, and Compound Solution. When given in powder, it should be united with opium, and formed into a pill with extract of liquorice. In poisoning by iodine, first evacuate the stomach, by giving an emetic in starch water, and afterward administer freely, starch water, or flour, or arrowroot in water.

Off. Prep.—Emplastrum Belladonnæ Compositum; Ferri Iodidum; Liquor Ferri Iodidi; Liquor Iodini Compositus; Potassii Iodidum; Tinctura Iodini; Tinctura Iodini Composita; Unguentum Iodidi Compositum.

IPOMÆA JALAPA.

Jalap.

Nat. Ord.—Convolvulaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE ROOT.

Description.—The root of Jalap is a roundish, somewhat pear-shaped tuber, externally blackish, internally white, with long fibers proceeding from its lower part, as well as from the upper root-stalks. The stems are several, roundish, smooth, herbaceous, of a reddish-brown color, much disposed to twist, and rising to a considerable height upon neighboring objects, about which it twines. The leaves are cordate, entire, smooth, conspicuously acuminate, deeply serrated at the base, the lower ones sometimes nearly hastate, or with diverging angular points, the under surface prominently veined, the petioles often nearly the length of the leaf. The peduncles about the length of the petioles, each one supporting two, rarely three flowers. The calyx is ebracteate, five-leaved, obtuse, with two of the divisions external. The corolla is funnel-form, of a lilac-purple color. Stamens five; anthers oblong, white, somewhat exserted. Ovary slender, bilocular. Style slender; stigma simple and capitate. Seeds not known.

History.—It is only within a few years that any certainty has existed in relation to the plant from which the jalap root was obtained. It was first spoken of in 1609, as *Bryonia Mechoacana Nigricans*, then it was regarded by Ray as *Convolvulus Americanus, jalapium dictus*, after which Tournefort, being misled by persons who stated that they had seen the plant growing, attributed it to a species of *Mirabilis*. Balfour placed

it as the *Exogonium Purga*, and Linnæus named it *Convolvulus Jalapa*, and thus much difference of opinion existed, until in 1827, when Dr. J. R. Coxe of Philadelphia, having received roots of the true Jalap from South America, from which he succeeded in producing a perfect flowering plant, first made known to the scientific world its true character. The name of *Ipomœa Purga* was bestowed upon the plant by Hayne and Wenderoth, but as the American authorities have a claim prior to all others, it may be considered as settled that *Ipomœa Jalapa*, the name originally given to it by Nuttall, is looked upon as the official species. The Jalap plant is a native of Mexico, growing at a height of about 6000 feet above the level of the ocean, near the city of Xalapa, in the state of Vera Cruz, from which city it is generally exported, and from which it also derives its name. It is usually imported in bags containing one or two hundred pounds. The root is the official part, and is gathered at all seasons, but principally in March and April, when the young shoots are appearing. The plant might be cultivated in the southern parts of the United States.

When fresh, the root is black externally, white and milky within, and varies in size according to its age, from that of a walnut to that of a moderate-sized turnep. It is dried in net bags over the fire, sometimes entire, and sometimes in sections. It is imported in irregularly round or pear-shaped masses, seldom as large as the fist, and is either entire, or divided into longitudinal or transverse slices. It is ponderous, hard, dark-brown externally, rough and wrinkled, internally grayish diversified by irregular concentric darker circles, in which the substance is denser and harder than in the intervening spaces. If moist, it is tough; if dry, rather brittle, with a shining undulated fracture, exhibiting numerous resinous points, distinctly visible with the microscope. The odor of jalap is faint and disagreeable, but stronger on rubbing or powdering it, and the taste is nauseous and sweetish, succeeded by some acidity. It is often attacked by insects, but its active portion or resin is left untouched by them, rendering it, consequently, more energetic; worm-eaten jalap may be employed for procuring the resin, but should not be formed into powder, as it would be above the proper strength. Jalap is rather difficult to pulverize, but if triturated with cream of tartar, sugar of milk, or other hard salt, the process of pulverization is facilitated, and the powder rendered much finer. When in powder, the color is a pale grayish-brown, and if inhaled, it irritates the nostrils and throat, and provokes sneezing and coughing. Its solvents are water, alcohol, or spirits. Water takes up but a small portion of its cathartic principle, but considerable of an amylaceous and mucilaginous extractive matter. Alcohol dissolves its resin, on which its cathartic virtues depend. Proof spirits or diluted alcohol completely extract its active properties. Analysis of the commercial jalap has detected in it, resin soluble in alcohol, a soft resin soluble in ether, also, colored gummy extract, starch,

albumen, lignin, numerous salts, and uncrystallizable sugar. Jalap root is seldom adulterated; the best quality may be known by being compact, ponderous, dry, dark, with many shining lines and points; if light, whitish internally, spongy, friable, and of a dull fracture, it should be rejected. Several adulterations are spoken of by authors, but they can usually be detected without difficulty. The resin is more liable to be adulterated with guaiacum, resin and colophony, and which may be detected by sulphuric ether which does not dissolve pure jalap resin.

Properties and Uses.—Jalap is an irritant and cathartic, operating briskly, producing copious liquid stools with griping, and sometimes accompanied with nausea and vomiting. Large doses produce violent hypercatharsis, sometimes terminating fatally. When applied to a wound it is said to induce purgation. Notwithstanding its activity, it is a safe and convenient purgative, much in use among the profession, and is applicable in all cases where it is desirable to produce a powerful influence on the bowels, or to obtain copious evacuations. In intestinal inflammations it should not be used. United with the bitartrate of potassa, its hydragogue properties are much increased, and thus proves beneficial in dropsies, as well as in some forms of scrofula. It is stated that the aqueous extract of jalap, the root having been previously exhausted of its resin by alcohol, will exert no cathartic influence, but will operate as a powerful diuretic. Three grains of jalap taken an hour before each meal, act as a slight nauseant, destroying a desire for food among persons who are apt to eat too freely. If jalap is digested in ether, its nauseous taste and smell will be wholly removed, without lessening its cathartic power. A biscuit is sometimes made for those to whom it is extremely nauseous and disagreeable; five drachms of jalap, thirty of sugar, and four ounces of flour, are made into fifteen biscuits after the usual mode; one biscuit is a dose. The tendency of jalap to gripe and nauseate, may be obviated by adding to the dose a grain or two of camphor, or three grains of cloves. The dose of jalap in powder is from fifteen to thirty grains (the aqueous extract ought not to be used, except as a diuretic); of the tincture, from one to four fluidrachms; the resin, or alcoholic extract is given in from four to eight grain doses, being usually rubbed up with sugar, or in emulsion, for the purpose of lessening its disposition to produce painful irritation of the intestinal mucous membrane. As a hydragogue, two drachms of the bitartrate of potassa is added to ten or thirty grains of pulverized jalap.

Off. Prep.—*Confectio Sennæ Composita*; *Extractum sive Resina Jalapæ*; *Pulvis Jalapæ Compositus*; *Tinctura Jalapæ Composita*.

IRIS VERSICOLOR.

Blue Flag.

Nat. Ord.—Iridaceæ. *Sex. Syst.*—Triandria Monogynia.

THE RHIZOMA.

Description.—*Iris Versicolor* is an indigenous plant, with a fleshy, horizontal, fibrous root or rhizoma. The *stem* is two or three feet in height, terete, flexuous, round on one side, acute on the other, and frequently branched. The *leaves* are about a foot long, half an inch to an inch wide, ensiform, striated, erect, and sheathing at base. *Bracts* scarious. The *flowers* are from two to six in number, and usually blue or purple, though varying much in color. *Peduncles* are of different lengths, and flattened on the inside. *Sepals* spatulate, beardless, the border purple, and the claw variegated with green, yellow, and white, and veined with purple. *Petals* erect, varying in shape from spatulate to lanceolate, usually paler than the outer, entire or emarginate. *Stigmas* three, petaloid, purple or violet, bifid, crenate, and more or less reflexed at the point. *Stamens* three, concealed under the stigmas, with oblong-linear anthers. *Capsule* three-celled, three-valved, and when ripe oblong, turgid, three-sided, with roundish angles. *Seeds* numerous, flat.

History.—Blue Flag is found in all parts of the United States, growing in low wet places, in meadows, and on the borders of swamps, serving to adorn them with its large and beautiful flowers, which make their appearance in June. They afford a fine blue infusion, which serves as a test of acids and alkalies. The root is the officinal portion, it has a peculiar odor, augmented by rubbing, and a nauseous taste, imparting to the fauces a powerful sense of heat and acrimony. In appearance the root very much resembles that of the *Acorus Calamus*. Its active properties are taken up by alcohol or ether, and its acrimony, as well as medicinal activity, is impaired by age. If cut when fresh into slices, dried at the temperature of about 100°, and then powdered and kept in bottles or tin cans excluded from the air and light, the root retains its virtues unimpaired for a long time. It contains mucilage, oil, and resin, from the former of which it derives diuretic properties, by decoction. The *resin* is of a light brown color, of a faint odor, and of a taste resembling that of the root; when perfectly freed from oil it is whitish yellow. Its therapeutical influences are not positively known. The *oil* possesses in a high degree the taste and smell of the root, and is the principle to which it owes its medicinal activity. The *oleo-resin* is obtained for medical purposes, under the name of Iridin.

Properties and Uses.—This is one among our most valuable medicinal plants, and is employed almost exclusively by Eclectics. It has been termed the Mercury of Eclectic practice, in consequence of the many

indications it is capable of fulfilling. It is cathartic, alterative, sialagogue, vermifuge, and diuretic. In dropsy, it may be used alone in doses of ten grains of the powdered root every two hours, as a hydragogue, or it may be combined with corn snakeroot, *Eryngium Yuccifolium*. In anasarca and hydrothorax, the saturated tincture of the root, taken in teaspoonful doses, every two or three hours, until its hydragogue influence is obtained, will be found serviceable; in some instances it may be combined with an equal quantity of the saturated tincture of *Euphorbia Ipecacuanha*. In scrofula, and syphilis, whether primary or secondary, it acts as a powerful and efficacious agent, and may be used alone, or combined with mandrake, poke, black-cohosh, and other alteratives. In chronic, hepatic, renal, and splenic affections, five or ten grains of the powdered root, will be found very valuable. Equal parts of blue flag root, mandrake root, and prickly-ash bark, combined, and given in doses of ten grains every two or three hours, to fall short of catharsis, will act as a powerful alterative, frequently causing a copious salivation without injury to the teeth or gums. In chronic rheumatism, mercurio-syphilis, dyspepsia, tapeworm, gonorrhea, leucorrhea, dysmenorrhea, and constipation, it has been used with positive advantage, either alone, or in combination with other agents. A writer says, "The root of the Blue Flag extends its influence through every part of the system in small doses and repeated at short intervals; it seems to act more particularly on the glandular system, exciting them to a discharge of their respective offices; in large doses it evacuates and exhausts the system, acting on the liver, and the alimentary canal throughout."

In Eclectic practice salivation is not, as a general rule, desired for the cure of disease, yet we have many articles which produce it, and often without the practitioner's being aware of the fact, and hence, when it does occur, the cry is at once raised that Eclectics use mercury. Salivation caused by vegetable agents may be known from that by mercury, by the absence of mercurial fetor, and no sponginess of the gums or loosening of the teeth. The dose of pulverized blue flag is from five to twenty grains; of the saturated tincture, from ten to sixty drops. In some persons, and when exhibited in large doses, it is apt to occasion much distressing nausea, with considerable prostration, these effects may be obviated or mitigated, by combining it with a few grains of capsicum or ginger, a grain of camphor, or four or five grains of caulophyllin.

There are several species of *Iris*, as *I. Virginica*, *I. Lacustris*, etc., which probably possess similar properties, and which are often collected and mixed with the officinal article. The *Iris Florentina*, or Florentine Orris, is said to be emetic, cathartic, and diuretic, but is seldom employed, except in the composition of tooth-powders, and to conceal an offensive breath.

Off. Prep.—Extractum Iridis Hydro-alcoholicum; Extractum Iridis Fluidum; Tinctura Iridis; Syrupus Stylingiæ Compositus.

IRIDIN.

Iridin.

THE OLEO-RESINOUS PRINCIPLE OF IRIS VERSICOLOR.

Preparation.—This is prepared in the same manner as Aletrin, but being an oleo-resin cannot be reduced to powder. I had the pleasure of calling the attention of the profession to this article in 1844, about the same time I introduced the podophyllin, (to remarks on which I refer the reader) and again in 1846. I have used it extensively and find it to be an invaluable medicine. It is now prepared by W. S. Merrell of Cincinnati, for the use of practitioners generally. It is soluble in alcohol, but insoluble in water.

Properties and Uses.—This is cathartic, alterative, sialagogue, diuretic and anthelmintic. I have used it more or less extensively for several years in combination with the resin of podophyllum, and in the form of pill, for dropsy, primary and secondary syphilis, chronic visceral affections, rheumatism, gonorrhea, and many female affections. It is not as nauseating, when given alone, as podophyllin, and requires rather larger doses. One grain triturated with ten grains of sugar, may be given in three-grain doses, every hour or two, until a cathartic effect is produced. I have long used the following as a sialagogue in those cases of glandular diseases which seemed to resist the action of other means, viz: equal parts of Iridin, Podophyllin, and Xanthoxylin, given in grain doses every hour or two until ptialism was produced. By trituration with sugar or lactic acid, this combination becomes more active. Iridin is not as prompt in its effects as Podophyllin, although it may be substituted for this in all instances; and its alterative influence, though slowly developed and without any immediate appreciable effect, is yet positive and certain. For the last six years I have used it in preference to the Podophyllin, in uterine diseases conjoined with Cimicifugin. The usual dose of Iridin is from one-half of a grain to five grains. Physicians will occasionally meet with patients upon whom Podophyllin, even in small doses, exerts a powerful and long continued influence, sometimes not readily obviated; in such cases, Iridin seems to me to be more especially indicated. The addition of capsicum or caulophyllin to iridin, mitigates any harshness of action which it may produce. A combination of Iridin, Podophyllin and Xanthoxylin, or Corydallia is a most powerful and certain remedy for syphilis, either primary or secondary, and will be found very useful in scrofula. Iridin three grains, leptandrin six grains, and bitartrate potassa twenty grains, made into one powder, forms a hydragogue cathartic of much value in some forms of dropsy. Iridin may be used in all cases where the root of the Iris is indicated.

JANIPHA MANIHOT.

Tapioca.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE FECULA OF THE ROOT.

Description.—This is the *Cassava* plant of the West Indies, and the *Mandioca* or *Tapioca* of Brazil. It has a large, white, fleshy, oblong, tuberous root, often weighing thirty pounds, and full of a wheyish, venomous juice. The stems are white, crooked, brittle, jointed, pithy, usually six or seven feet high, and having a smooth, white bark; the branches are crooked, and have, on every side, near their tops, leaves which are irregularly placed on long terete petioles, broadly cordate in their outline, and divided nearly to their base into five, spreading, lanceolate, entire lobes, attenuated at both extremities, dark-green above, pale glaucous beneath; the midrib strong, prominent and yellowish-red below, with several oblique veins, connected by lesser transverse ones, branching from it. *Stipules* small, lanceolate, acuminate, caducous. The flowers are in axillary and terminal racemes. *Pedicels* with small, subulate bracts at their base. *Male flowers* smaller than the female. *Calyx* campanulate, divided into five spreading segments, purplish externally, fulvous-brown within. *Disk* orange-colored, fleshy, annular, ten-rayed. *Stamens* ten, alternating with the lobes of the disk. *Filaments* shorter than the calyx, white, filiform, free. *Anthers* yellow, linear-oblong. *Female flower* of the same color as the male, deeply five-parted, the segments lanceolate-ovate, spreading. *Disk* an annular, orange-colored ring, in which the purple, ovate, furrowed ovary is imbedded; *style* short; *stigmas* three, reflexed, furrowed and plaited, white. *Capsule* ovate, three-cornered, tricoccous. *Seeds* elliptical, black, shining with a thick fleshy funiculus.

History.—This plant, formerly designated by botanists as the *Jatropha Manihot*, until separated by Kunth, is a native of South America, and is cultivated extensively in many parts of it, for the sake of its root, which serves as an article of food. The plant grows rapidly, and the root matures in about eight months. There are two varieties of the plant; the root of one variety is fusiform, brown externally, not exceeding six ounces in weight, with a sweet, amylaceous taste, and which may be eaten with impunity. This is termed Sweet Cassava. The root of the other and more common variety, is much larger, knotty, and black externally, abounds in an acrid milky juice, has a bitter taste, and is a deadly narcotic poison in the recent state. This is called Bitter Cassava, and its poisonous properties are said to be owing to the presence of hydrocyanic acid. Both varieties abound in starch. Tapioca is prepared from the Bitter Cassava. The root, which is very large, white, fleshy and tuberous, is reduced to a pulp, this is washed with cold water in

funnel-shaped mat-filters, the starch is allowed to subside in the milky fluid which passes through, and is then elutriated in the usual manner, and finally converted into the granular form by drying it on hot plates. Should any of the volatile poisonous principle remain in the meal previous to drying it, the heat employed for this purpose entirely removes it. Tapioca is a very pure starch, in the form of irregular warty grains, seldom larger than a pea, white, tasteless and inodorous. Boiling water dissolves it almost entirely,—or, if in small proportion to the tapioca, it forms with it a translucent, tasteless jelly, and firmer than is made with most varieties of starch. Cold water partially dissolves it, forming a liquid which yields a blue precipitate with iodine. Under the microscope it is found to consist of aggregated starch-globules, about the two thousandth of an inch in diameter, partly broken, partly entire, the broken ones only being soluble in cold water, more uniform than the granules of most other varieties of fecula, with a distinct hilum which is surrounded by rings, and cracks in a stellate manner. The rupture observed in some of the granules, is owing to the heat employed in drying.

Properties and Uses.—Nutritive and demulcent. Used as a light and agreeable nourishment for the sick ; it makes an excellent nourishment for infants about the time of weaning, and is less apt to turn sour on their stomach, than any other kind of farinaceous food. For the sick and convalescent, lemon juice and sugar form agreeable additions ; and in low states of disease, or debility, it may be improved by the addition of wine, nutmeg, or other aromatic.

JEFFERSONIA DIPHYLLA.

Twinleaf.

Nat. Ord.—Berberidaceæ. *Sex. Syst.*—Octandria Monogynia.

THE ROOT.

Description.—This is an indigenous, perennial plant, sometimes known as *Ground-squirrel Pea*, and *Rheumatism Root*. The *rhizoma* is horizontal, with matted fibrous radicles ; the *scape* or *stem* is simple, naked, one-flowered, and from eight to fourteen inches in height. The *leaves* are in pairs, binate, placed base to base, oval, broader than long, ending in an obtuse point, smooth, glaucous beneath, and on petioles as long as the scape, which arise from the rhizoma. The *flowers* are large, regular, white. The *calyx* consists of four, colored, deciduous sepals. The *corolla* has eight flat, oblong, spreading, incurved petals. The *stamens* are eight, with oblong-linear anthers on slender filaments. *Ovary* ovoid, soon gibbous, pointed ; stigma two-lobed. The *capsule* is obovate, or somewhat pear-shaped, stipitate, one-celled, opening half-way round horizontally, making a persistent lid. *Seeds* many on the lateral placenta, with a fleshy lacerate aril on one side, oblong.

History.—This plant is found from New York to Maryland and Virginia, and in many parts of the Western States, growing in limestone soil, in woods, and near streams and rivers, flowering in April and May. The root is the officinal part, it is yellow like the *Hydrastis*, but much larger, it has a pungent, nauseous, bitterish, and acrid taste, and an odor resembling *Podophyllum*. Water or alcohol extracts its virtues. It has not been analyzed.

Properties and Uses.—Diuretic, alterative, antispasmodic, and a stimulating diaphoretic. Successfully used in chronic rheumatism, secondary or mercurio-syphilis, syphilitic pains, dropsy, in many nervous affections, spasms, cramps, nervous excitability, and even during pregnancy. In syphilitic diseases it is combined with *corydallis*. As a gargle it has been beneficial in diseases of the throat, ulcers about the fauces, scarlatina, ophthalmia, and indolent ulcers. It is administered in decoction and saturated tincture. Dose of the decoction, from two to four fluidounces, three times a day; of the tincture, from one to three fluidrachms, three times a day.

Off. Prep.—Decoctum Jeffersoniæ.

JUGLANS CINEREA.

Butternut.

Nat. Ord.—Juglandaceæ. *Sex. Syst.*—Monœcia Polyandria.

THE INNER BARK OF THE ROOT, AND LEAVES.

Description.—This tree, also known as *White Walnut*, *Oil Nut*, etc., is indigenous, and grows to a height of from thirty to fifty feet, with a trunk three or four feet in diameter at the distance of five feet from the ground. At a short distance from the ground, the stem divides into numerous, nearly horizontal, wide-spreading *branches*, covered with a smooth, gray bark, and forming a large tufted head, giving to the tree a peculiar appearance. The *leaves* are alternate, from twelve to twenty inches long, and consist of seven or eight pairs of *leaflets*, which are two or three inches in length, oblong-lanceolate, rounded at the base, acuminate, finely serrate and downy, the petioles and branchlets downy with clammy hairs. The male and female *flowers* are distinct upon the same tree. The former are in large aments, four or five inches long, hanging from the sides of the last year's shoots, near their extremities. The scales which compose them are oblong and deeply-cleft on each side into about three teeth or segments. The anthers are about eight or ten in number, oblong and nearly sessile. The fertile flowers grow in a short spike at the end of the new shoot; they are sessile, and universally pubescent and viscid; when fully grown, they seem to consist of a large oblong *ovary* and a forked feathery *style*. The top of the ovary, however, presents an obscurely four-toothed *calyx*. Within this is a *corolla* of four narrow lanceolate petals growing to the sides of the style; the

style divides into two large, diverging, feathery, rose-colored *stigmas* nearly as long as the ovary. The *fruit* is sometimes single, suspended by a thin pliable peduncle; sometimes several are together on the sides and extremity of the same peduncle, of a green color, brown when ripe, oblong-oval, obtusely-pointed, hairy, and extremely viscid. The *nut* or *nucleus* is of a dark color, hard, oblong, pointed, carinated on both sides, its whole surface roughened by deep indentures and sharp prominences. The *kernel* is oily, pleasant-flavored, and edible.

JUGLANS NIGRA, or *Black Walnut*, grows from sixty to ninety feet high, with a diameter of from three to six feet, with a brown bark. The *leaflets* are numerous, seven to ten or eleven pairs, ovate-lanceolate, serrate, subcordate at base, taper-pointed at the apex, smooth above, the lower surface and the petioles minutely downy. The *fruit* is globose, with scabrous punctures, the *nut* corrugated, and its kernel sweet, more pleasant-tasted and less oily than the butternut, but greatly inferior to the European walnut, *Juglans Regia*.

History.—These trees are common to North America. The *J. Cinerea* is found in Canada, and throughout the whole northern, eastern, and western sections of the United States, in rich woods, on elevated river-banks, and on cold, uneven rocky soils, flowering in April and May, and ripening its fruit in September. The tree, if tapped just before the unfolding of the leaves, yields a richly-saccharine juice, from which sugar may be obtained, nearly if not quite equal to that from the sugar-maple. The wood is light, of a reddish hue, but on account of its durability and exemption from the attacks of worms, is considerably used in panneling and ornamental work. The fruit, when quite young, is made into pickles, and the bark is employed for dying wool a dark-brown color, though inferior for this purpose to that of the black walnut. In the recent state it is acrid, and when applied to the skin, produces a rubefacient effect. The inner bark is the medicinal portion, especially of the root, and should be collected in May or June. When first uncovered on the tree, the inner bark is pure white, but soon becomes a lemon, and ultimately a deep-brown color; it is of a fibrous texture, a slight odor, and a peculiar, bitter, subacrid taste. Boiling water completely extracts its medical virtues. No satisfactory analysis of the inner bark of this tree has been made.

The *J. Nigra* is rarely found in the Northern States, but is more common to the Middle and Western. It flowers and ripens its fruit at the same time with the butternut. The duramen of its wood is compact and heavy, of a deep violet-color, surrounded with a white alburnum. It is extensively used in building, and for cabinet-work.

Properties and Uses.—Butternut is a pleasant and mild cathartic, operating without pain, irritation, or subsequent debility of the alimentary canal, somewhat of the cathartic character of rhubarb, but without

inducing constipation after its action. It is especially adapted to cases of habitual constipation, dysentery, and other affections of the bowels. It is generally used in the form of an extract, in doses of from ten to thirty grains. A strong decoction of it is much employed in some sections of the country, as a domestic remedy in intermittent and remittent fevers, as well as in other diseases attended with congestion of the abdominal viscera; it is also reputed efficacious in murrain of cattle, and yellow-water in horses. The juice of the rind of the black walnut (*Juglans Nigra*) is said to remove ringworm and tetter; and a decoction has been used as a vermifuge. Its bark is acrid and styptic, seldom used except for tinctorial purposes. The European walnut (*Juglans Regia*) has recently been found by Professor Négrier, of Angers, in the highest degree efficacious in scrofula. He gave to children a teacupful of a strong infusion of the leaves, or six grains of the aqueous extract, or an equivalent dose of a syrup prepared from it two to four times a day; if there were ulcers or sore eyes, a strong decoction was applied to them. No injury was ever experienced from a long-continued use of the remedy. It appears to act as a moderately aromatic bitter and astringent. The above American species would probably answer as good a purpose. *Juglandin* is the name of an agent just prepared from the *J. Cinerea*, by Mr. W. S. Merrell. It is of a jet-black color, brittle like starch, with the peculiar odor of the bark, and a bitter, somewhat pungent and aromatic taste, with a stimulant effect on the fauces. It is insoluble in water, but becomes soluble on the addition of ammonia or liquor potassa; and the addition of acids to the solution precipitates the juglandin. Sulphate of iron added to water containing juglandin, darkens it. It is nearly soluble in alcohol, more so on the addition of ammonia; partially soluble in ether. Muriatic acid turns a thin layer of it green; sulphuric acid, reddish-black; and with nitric acid it effervesces, and becomes yellowish-red. So far as employed, this article has answered an admirable purpose as a laxative and cathartic, in doses of from one to five grains; and will, probably, prove an invaluable agent. It is prepared by adding a saturated tincture of the bark of butternut to twice its volume of water, and distilling off the alcohol; the juglandin is precipitated in the water, from which it must be removed and dried. Combined with Castile soap it operates more promptly.

Off. Prep.—Extractum Juglandis.

JUNIPERUS COMMUNIS.

Juniper.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Dicœcia Monadelphia.

THE FRUIT OR BERRIES.

Description.—This is an erect, evergreen shrub, generally small, but occasionally attaining a height of twelve or fifteen feet, with numerous,

very close branches, the extremities of which are smooth and angular. The *leaves* are attached to the stem or branches in threes, in a verticillate manner, linear-acerose, sharply mucronate, entire, shining-green on their lower surface, channeled and glaucous along the center of their upper surface; they are always resupinate, and turn their upper surface toward the ground. The *flowers* are diœcious, the males in small axillary aments, with roundish, acute, stipitate scales, inclosing several anthers. Female flowers are on a separate shrub, having a small, three-parted involucre growing to the scales, which are three in number. The *fruit* is fleshy, roundish-oblong, berried, of a dark-purplish color, formed of the confluent succulent scales, marked with three prominences or vesicles at top, ripening the second year from the flower, and containing three seeds.

History.—The Juniper is a native of Europe, though naturalized in some parts of this country, growing in dry woods and hills, and flowering in May. The fruit, or berries, as they are generally called, are the officinal parts; those which are imported from the south of Europe are the best.—the American berries are greatly inferior in strength, and not much used. They are globular, more or less shriveled, about the size of a pea, marked with three furrows at the summit, covered with a glaucous bloom, beneath which they are of a shining, blackish-purple color, and containing a brownish-yellow pulp, and three angular seeds. They have an agreeable, aromatic odor, and a sweetish, warm, bitter, slightly terebinthinate taste, which properties they owe to an essential oil, the *oil of juniper*, which is obtained by distillation. The berries impart their virtues to water or alcohol. Beside volatile oil, they contain resin, gum, wax, sugar, lignin, water, and various saline substances.

Properties and Uses.—Both the berries and oil are gently stimulant, carminative, and diuretic. The oil is said to act like copaiba in arresting mucous discharges, especially from the urethra. It is contained in the spirituous liquor called Hollands, one of its best forms as a diuretic. Five minims of the oil, with one fluidrachm of nitrous ether, given three times a day in any common vehicle, produces diuresis in dropsy when other means fail. The berries are used principally as an adjuvant to more powerful diuretics. They have also been recommended in scorbutic and cutaneous diseases, catarrh of the bladder, and atonic conditions of the uterus and alimentary canal. Dose of the berries, from one to two drachms; of the oil, from four to six minims.

Off. Prep.—Pilulæ Saponi Compositæ; Tinctura Pinus Pendulæ Composita.

JUNIPERUS SABINA.

Savin.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Dioecia Monadelphia.

THE TOPS AND LEAVES.

Description.—*Juniperus Sabina*, is an evergreen, very compact shrub, growing from three to fifteen feet in height, with a disposition to spread horizontally rather than to form a stem. The *branches* are slender, round, tough, the bark of the young branches light-green, that of the trunk rough and reddish brown. The *leaves* closely invest the younger branches, are numerous, small, erect, firm, smooth, pointed, of a dark-green color, glandular in the middle, opposite, and imbricated in four rows. The *flowers* are male and female on different trees. The *fruit* is a deep bluish-purple, almost black, about the size of a currant, of an ovoid shape, marked with tubercles, the remains of the calyx and petals, and containing three seeds.

History.—This plant is a native of southern Europe, and is said to grow wild around our north-western lakes. The extremities of the branches and leaves are the officinal parts. When dried they fade very much in color; they have a strong, peculiar, rather unpleasant odor, especially when bruised, and a disagreeable, bitter, resinous, acrid taste. They impart their virtues to water or alcohol. Their properties are owing to an essential oil, *oil of Savin*, which is obtained by distillation; it is limpid and colorless. They are also said to contain gum, tannic or gallic acid, resin, chlorophylle, fixed oil, bitter extractive, lime, and salts of potassa.

Properties and Uses.—Emmenagogue, diuretic, diaphoretic, anthelmintic, and abortive. In over-doses it will produce gastro-enteritis. Useful in menorrhagia, and said to be beneficial in preventing threatened abortion. Care must be taken in its administration, as it may produce fatal results. It should never be given when much general or local inflammation exists, and it should never be used during pregnancy. Sometimes used for worms, with pink and senna. The oil (*oleum sabinae*), given two or three times a day, in doses of from ten to fifteen drops on sugar, is said to produce abortion, and it is apt to violently affect the stomach and bowels, bringing life into extreme danger. It is sometimes combined with oils of tansy, pennyroyal, and hemlock, as an emmenagogue and abortivant; dose, from two to four drops. Externally, the leaves in the form of cerate, have been used as a stimulant to indolent ulcers, and to maintain a discharge from blistered surfaces; and mixed with an equal weight of verdigris, the powder has been used for destroying venereal warts. Dose of powdered leaves, from five to fifteen grains, three times a day; of the infusion, from half a fluidounce to two fluidounces.

Off. Prep.—Ceratum Sabinæ; Decoctum Sabinæ; Tinctura Caulophylli Composita; Unguentum Sabinæ.

JUNIPERUS VIRGINIANA.

Red Cedar.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Dioecia Monadelphica.

THE LEAVES AND EXCRESCENCES.

Description.—*Juniperus Virginiana* is an evergreen tree of slow growth, seldom attaining a very large size, though sometimes rising forty or fifty feet in height, with a *stem* twelve or thirteen inches in diameter, straight and decreasing rapidly from the ground, giving off many horizontal branches; its surface generally unequal, and disfigured by knots, and the crevices and protuberances they occasion. The small twigs are covered with minute, densely imbricated leaves. These *leaves* are fleshy, ovate, concave, rigidly acute, with a small depressed gland on the middle of their outer side, growing in pairs which are united at the base to each other, and to the pairs above and below them. (A singular variety sometimes appears in the young shoots, especially those which issue from the base of the trees; this consists in an elongation of the leaves to five or six times their usual length, while they become spreading, acerose, remote from each other, and irregular in their insertion, being either opposite or ternate; such shoots are so dissimilar to the parent tree that they have repeatedly been mistaken for individuals of a different species.) The *barren flowers* grow in small oblong aments, formed by peltate scales with the anthers concealed within them. The fertile flowers have a proper perianth, which coalesces with the germ, and forms a small, roundish berry, with two or three seeds, covered on its outer surface with a bright blue powder.

History.—The Red Cedar grows in all latitudes of the United States, from that of Burlington, Vermont, to the Gulf of Mexico; it inhabits dry rocky situations, and is most abundant and vigorous in the southern States and maritime parts, and flowers in April and May. The interior wood is of a reddish color, fine-grained and compact, very light and durable, and is much used for tubs, pails, lead pencils, fences, etc. The tops and leaves are the officinal parts; they have a peculiar, not unpleasant odor, and a strong, bitterish, somewhat pungent taste. Their virtues reside chiefly in an essential oil, and are readily imparted to alcohol. The leaves bear a close resemblance to those of the *Juniperus Sabina*, for which they are often but incorrectly employed, and from which they can be distinguished only by the difference of odor. Analysis has found in them volatile oil, gum, tannic acid, albumen, bitter extractive, resin, chlorophylle, fixed oil, lime and lignin. Excrescences are often found on the small branches, known as *Cedar Apples*, and produced, like galls, by the puncture of an insect; they have a somewhat aromatic odor, and a bitterish taste. These are sometimes powdered, and administered successfully as a vermifuge, in doses of from ten to twenty grains, three times a day, in some convenient vehicle.

Properties and Uses.—Same as the *Juniperus Sabina*, but less energetic, and used in the same diseases; also in scalding of urine, and derangement of the kidneys and bladder, with spearmint and marsh-mallows. The oil makes a valuable external stimulating application for rheumatic pains, bruises, etc. Dose of the leaves, from one to two drachms; of the oil, from ten to fifteen drops.

The excrescences or *cedar apples*, as they are called, which are sometimes found on the tree, are decided anthelmintics. The following makes a pleasant and excellent vermifuge and tonic, for pale, sickly children; I have used it with much success in hundreds of cases: Take of cedar apples one pound; of black alder berries, (*Prinos Verticillatus*) one pint by measure; digest these for fourteen days, in one quart of alcohol, and one pint of molasses. The more recent the articles, the better. Dose, one fluidrachm, three times a day, for a child one or two years old; it is laxative, tonic and vermifuge.

Off. Prep.—Linimentum Olei.

KALMIA LATIFOLIA.

Sheep Laurel.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—This plant is known by various names in different sections of the country, as *Laurel*, *Lambkill*, *Ivy*, *Big-leaved Ivy*, *Spoon-wood*, *Calico-bush*, *Mountain Laurel*, etc. It is a beautiful shrub, from four to eight feet high, sometimes attaining the height of a small tree; usually with very crooked stems, covered with a light-colored rough bark. The *leaves* are irregularly alternate and ternate, evergreen, coriaceous, very smooth, with the under side somewhat paler, ovate-lanceolate, acute at each end, entire, on long petioles at the ends of the branches, and from two to three inches long. The *flowers* are numerous, white or variously tinged with red, very showy, clammy, and are disposed in splendid terminal, viscid-pubescent, simple or compound *corymbs*, with opposite branches. *Pedicels* glutinous, pubescent, with ovate, acuminate bracts. *Calyx* small, five-parted, persistent, with oval acute segments. *Corolla* large, monopetalous, with a conical tube, a cyathiform limb, and an erect, shallowly five-lobed margin; at the circumference of the limb, on the inside, are ten niches or pits, accompanied with corresponding prominences on the outside; in these depressions the anthers are found lodged at the time when the flower expands. The *stamens* are ten, hypogynous, bent outwardly so as to lodge their anthers in the niches of the corolla, but liberating them during the period of flowering and striking against the sides of the stigma; *anthers* two-celled, with two terminal pores. The *ovary* is roundish, supporting a slender,

declinate *style* longer than the corolla; *stigma* obtuse. *Fruit* a dry capsule, which is roundish, depressed, five-celled, five-valved, the valves alternating with the divisions of the calyx. The *seeds* are numerous and minute.

History.—Sheep-Laurel is found in most parts of the United States, on rocky hills and mountains, and in damp soil, sometimes forming dense thickets, with a profusion of beautiful rose-colored flowers which appear in June and July, forming a contrast with its dark shining green leaves. The leaves have poisonous narcotic properties, and prove fatal to sheep and some other animals, while goats, deer and partridges feed upon them with impunity. Where partridges which have fed upon them, have been eaten, it is said to have caused nausea, temporary blindness, pain in the head, dyspnoea, pallid countenance, cold extremities, feeble pulse, and even death. An emetic of mustard with warm water, has relieved some of the above symptoms, by removing the poison from the stomach. It is very doubtful, however, whether these symptoms were caused by the poisoned flesh of the birds, as numerous persons eat partridges that have been feeding on the laurel, without the least inconvenience. The presumption is that the poisonous character of the flesh was caused by a peculiar state of animal decomposition. The Indians are said to use the expressed juice of the leaves, or a strong decoction, for the purpose of committing suicide. The leaves are the officinal parts, and yield their virtues to alcohol or water. They contain gum, tannic acid, resin, chlorophylle, fatty matter, a substance resembling mannite, an acrid principle, wax, extractive, albumen, yellow-coloring matter, lignin, and salts of potassa, lime, and iron.

Properties and Uses.—In immoderate doses, Sheep-laurel is a poisonous narcotic, producing vertigo, dimness of sight, great depression of the action of the heart, and cold extremities. In medicinal doses it is sedative, antisyphilitic, and astringent. Internally, either in powder, decoction, or tincture, it is an efficacious remedy in primary or secondary syphilis, and will likewise be found invaluable in febrile and inflammatory diseases, and hypertrophy of the heart, allaying all febrile and inflammatory action, and lessening the action of the heart. In active hemorrhages, diarrhea, and dysentery, it has been employed with excellent effect. I have extensively used this agent, and regard it as one of our most efficient agents in syphilis; and have likewise found it very valuable in inflammatory fevers, jaundice, and ophthalmic neuralgia and inflammation. The remedy must always be used with prudence, and should any of the above-mentioned symptoms appear, the dose must be diminished, or its use suspended for a few days. In cases of poisoning by this article, stimulants, as brandy, whisky, etc., must be given, with counter-irritation to the spine and extremities. Sheep poisoned by eating the leaves, have been saved by administering a gill or two of whisky to them. Externally, the fresh leaves stewed in lard, or the dried leaves

in powder mixed with lard to form an ointment, are said to be beneficial in tinea-capitis, psora, and other cutaneous affections. Some time since I treated a case of syphilis of five weeks' standing, which had not received any kind of treatment during that period. The patient, at the time I saw him, had several chancres, the surface of the body and head was covered with small red pimples, elevated above a jaundiced skin, and he was in a very debilitated condition; I administered a saturated tincture of the leaves of *Kalmia*, and touched the chancres with tincture of muriate of iron, and effected a cure in four weeks, removing the jaundice at the same time. The saturated tincture of the leaves is the best form of administration, it may be given in doses of from ten to twenty drops, every two or three hours; the decoction may be given in doses of from half a fluidounce to a fluidounce; and of the powdered leaves from ten to thirty grains. There are other species of *Kalmia*, as *K. Glauca* or Swamp Laurel, and *K. Angustifolia*, or Narrow-leaved Laurel, which probably possess similar properties.

Off. Prep.—Decoctum *Kalmiæ*; Syrupus *Phytolacæ Compositus*; Tinctura *Kalmiæ*.

KINO.

Kino.

THE INSPISSATED JUICE OF *PTEROCARPUS MARSUPIUM*, AND OTHER PLANTS.

Description.—For a long time the origin of Kino was unknown, but it has recently been ascertained to be the product of a lofty tree, growing upon the mountains of the Malabar coast of Hindostan, named *Pterocarpus Marsupium*, belonging to the *Natural Order Fabacæ*. It has an erect, very high *trunk*, rarely straight. The outer layer of *bark* is brown, spongy, falling off in flakes, and the inner is red, fibrous, and astringent. The *branches* are spreading, horizontal, numerous, extending far. The *leaves* are sub-bifarious, alternate, pinnate with an odd one, eight or nine inches long; *leaflets* five, six, or seven, alternate, elliptic, emarginate, firm, deep-green and shining above, less so below, from three to five inches long, and two or three broad. The *petioles* are round, smooth, waved from leaflet to leaflet, and five or six inches long; *stipules* none. *Panicles* terminal, very large; ramifications bifarious, like the leaves. *Peduncles* and *pedicels* round, a little downy. *Bracts* small, caducous, solitary below each division and sub-division of the panicle. *Flowers* very numerous, white, with a small tinge of yellow. *Vexillum* with a long slender claw, very broad; sides reflexed, waved, curled, veined; *keel* two-petalled, adhering slightly for a little way near the middle, waved, etc., same as the vexillum. *Stamens* ten, united near the base, but soon dividing into two parcels of five each; *anthers* globose, two-lobed. *Ovary* oblong, pedicelled, hairy, generally two-celled; *cells*

transverse, and one-seeded. *Style* ascending. *Legume* on a long petiole, three-fourths orbicular, the upper remainder, which extends from the pedicel to the remains of the style, is straight, the whole surrounded with a waved, veiny, downy, membranous wing, swelled, rugose, and woody in the center, where the seed is lodged, not opening; generally one but sometimes two-celled. *Seeds* single, reniform.

History.—Kino is the juice of the tree obtained by making longitudinal incisions in the bark; it flows abundantly, and of a red color, and by drying it in the sun, it cracks into irregular angular masses, which are placed into wooden boxes for exportation. It sometimes comes to this country direct from the East Indies, but more generally from England. East India Kino, which is the ordinary kino of the shops, is usually in small, irregular, angular, shining fragments, in size between a pin's head and a pea, of a dark-reddish-brown or blackish color, opaque, very brittle, easily pulverizable, and affording a reddish powder, much lighter colored than the drug in its aggregate state, and which becomes brownish on being kept for some time. It is inodorous, and of an intense, pure astringent, with barely perceptible bitterness, and leaving a sweetish after-taste in the mouth. It burns without fusion or softening, and with but little flame and frothing, leaving a scanty gray ash. Boiling water dissolves a large proportion of it, forming when cold, a permanent, intense blood-red solution; and which yields, with sesquichloride of iron, a dark-green, coarsely flocculent precipitate, which is so abundant as to render the whole liquid pulpy. Acetate of lead affords a gray precipitate, and tartar emetic a gradually formed lake-red muddy jelly. Cold water forms with it a clear cherry-red solution, leaving a crumbly, grayish residuum. Alcohol dissolves about two-thirds of it, and forms a deep brownish-red tincture, which is not disturbed by water. By long standing, the tincture gelatinizes, and loses its astringency. Proof spirit is a less complete solvent, but the tincture is less apt to gelatinize. Alkalies favor its solubility in water, but change its nature, and destroy its astringency. When chewed, Kino softens in the mouth, slightly adheres to the teeth, and colors the saliva blood-red. It is found to contain 75 per cent. of tannin, and peculiar extractive, 24 of red gum, one of insoluble matter, and according to Buchner catechuin or catechuic acid. Its aqueous solution is *incompatible* with gelatin, the soluble salts of iron, silver, lead, antimony, bichloride of mercury, and the sulphuric, nitric and muriatic acids.

There are many other exudations known in commerce as Kino, some of which are used principally for the purpose of adulterating the finer sorts; among the most important are the African Kino, Dhak-tree Kino, Botany Bay Kino, Jamaica Kino, and South American Kino.

The *African Kino*, is at present very rarely seen in commerce; from specimens sent home by Mungo Park during his last journey, it was

decided an exudation from the *Pterocarpus Erinaceus*, a tree growing in Senegal, and upon the banks of the Gambia, on the western coast of Africa.

The *Dhak-tree Kino* is the product of the *Butea Frondosa*, a magnificent leguminous tree of the East Indies. The juice naturally exudes from fissures in the branches of the tree, and concretes into red tears which become black under the action of the sun. They are irregularly angular, seldom so large as a grain of barley, apparently black and opaque, but really of an intense garnet-red color, translucent in thin pieces, and frequently have fibers of bark adhering to one of their faces. Their taste is very astringent, brittle when chewed without adhering to the teeth, and tinge the saliva red. Their relations to water, alcohol, and other chemical reagents are very nearly similar to those of ordinary Kino. They contain from 73 to 90 per cent. of tannin. This Kino is much used in the arts in India, and would undoubtedly answer as well in medicine as the Kino of commerce. It is seldom imported into England, and never, at present, into this country.

The BOTANY BAY KINO is the concrete juice of the *Eucalyptus Resinifera*, or Brown Gum tree of New Holland, a fine tall tree belonging to the Natural Order, *Myrtaceæ*, and Sexual System, *Icosandria Monogynia*. When the bark of this tree is wounded, a red juice flows so profusely that sixty gallons may be collected from one tree. Mr. White states that five hundred pounds of Kino may be obtained in one year from a single tree. The juice concretes into a resinous-like substance, on the branches and trunk, which is at first reddish and translucent, but ultimately chocolate-colored and opaque. It is in irregular masses, free from impurity, generally covered with a reddish powder from attrition, compact, very brittle, deep brownish-black, resinous in luster, and opaque even in thin fragments. It is more bitter and less astringent than ordinary Kino, and tinges the saliva a dirty-lake red. It is easily powdered, the powder being of an umber color; softens and swells up by heat, and burns with a dense flame or white smoke before it becomes perfectly charred. Cold water does not readily act upon it, slowly acquiring a pale-yellowish tint after an hour or two, with but little change in the appearance of the Kino; boiling water dissolves considerable of it, forming a deep cherry-red solution, which, on cooling, precipitates a copious brick-colored deposit, if the solution be made with one part of the Kino to twenty-five of water. The remaining solution is yellowish-brown, and yields a deep-green turbid fluid with sesquichloride of iron, and a grayish-yellow precipitate with acetate of lead. Alcohol dissolves it in large proportion, forming a deep yellowish brown tincture. It is not so common in Europe as it was some years since, and is seldom seen in this country.

JAMAICA OR WEST INDIA KINO, is presumed to be the product of the *Coccoloba Uvifera*, or Sea-side grape, belonging to the Natural Order,

Polygonaceæ, obtained by evaporating a decoction of the wood and bark. This tree grows in the West Indies and neighboring parts of the continent. The evaporated fluid while in a semi-liquid state is poured into gourds, and allowed to harden. When removed from the gourd, it breaks into fragments of various sizes, having a tendency to the rectangular form, and about as large as a small cherry. Their consistence is uniform, their surface smooth and shining, and their color a very dark reddish-brown. They are not so shining nor so black as the common Kino; are opaque in mass, translucent and ruby-red in thin fragments. They are readily fractured and pulverized, forming a dull-reddish powder, much paler than the commercial drug. They are inodorous, but very astringent and bitterish, very slightly adhering to the teeth when chewed, and coloring the saliva red. Cold water dissolves 89 per cent., and officinal alcohol 94 per cent. It contains about 41 per cent. of tannin.

The SOUTH AMERICAN, COLUMBIA, or CARACCAS KINO is probably derived from the *Coccoloba Unifera*, which grows upon the continent as well as in the islands. It is imported in heavy masses, and closely resembles the Jamaica Kino, in color, luster, taste, and other properties, with the exception that it is nearly equally soluble in cold water and alcohol; without any adhesive matter to impede filtration in the aqueous solution, and wanting a minute proportion of resinous matter.

Properties and Uses.—Kino is a pure and energetic astringent, and may be used to fulfill all the indications for which catechu is employed. It is not considered so efficacious in chronic dysentery as catechu, but is preferred internally in menorrhagia, and as a topical application in leucorrhœa, relaxed sore-throat and aphthæ of the mouth or fauces. An infusion thrown into the nostril has suppressed hemorrhage from the Schneiderian membrane: and the powder on lint has suppressed a hemorrhage from a wound in the palate, which had resisted various means. Dose of the powder, from ten to thirty grains; of the tincture, from half a fluidrachm to two fluidrachms.

Off. Prep.—Pilulæ Camphoræ Compositæ; Tinctura Kino.

KRAMERIA TRIANDRIA.

Rhatany.

Nat. Ord.—Polygalaceæ, *Decandolle*; Krameriaceæ, *Lindley*. *Sex. Syst.*—Tetrandria Monogynia.

THE ROOT.

Description.—Rhatany is a suffruticose plant, with a horizontal, very long and branched root, with a thick bark, reddish-brown externally, and red internally. The stem is round, procumbent, much branched,

taper; the *branches* are two or three feet long, white and silky when young, but black and naked when old. The *leaves* are alternate, sessile, oblong-ovate, pointed, entire, and covered on both surfaces with silky hairs. The *flowers* are lake-colored, solitary, axillary, and on short peduncles. The *calyx* consists of four red sepals, the inferior largest, hairy externally, but smooth and shining on the inner surface. The *corolla* is formed of four petals, the two upper separate, spathulate, the two lateral, roundish and concave. *Stamens* three, hypogynous, with small, urceolate anthers, having two openings at their apex. The *ovary* is ovate, supporting a small red style, crowned with a simple stigma. The *fruit* is a dry, globose berry or drupe, about the size of a pea, covered with stiff reddish-brown hairs, and furnished with one or two seeds.

History.—This species of *Krameria* is a native of Peru, usually growing in dry argillaceous and sandy places, on the sides of mountains, flowering throughout the year, but most freely in October and November. It was long known to the natives as a powerful astringent, previous to its discovery in 1780 by Ruiz. The root is the officinal part; it is dug up after the rains in large quantities, and after being well dried are exported, principally to Portugal, where they are employed to adulterate red wines. Sometimes an extract is prepared from them, which is exported and used in a similar manner. As imported, it consists of a short root-stock from half to two inches in diameter; and several roots proper, which are simple or branched, one or two feet long, and between the thickness of a goosequill and that of a man's thumb. Its bark is dark brownish-red, wrinkled, and warty on the root-stock, brittle, inodorous, and of a strongly astringent and slightly bitterish taste. The woody interior is yellowish-red, dense, tough, and of the same taste, but much weaker. Cold water, rectified, or proof spirit, readily extracts its active constituents. In powder it is of a reddish color. The bark contains more of the medical virtues than the ligneous or woody part. By maceration, boiling water takes up the virtues of the root, forming a turbid solution on cooling, in consequence of the deposition of apotheme taken up by the water when heated. If boiled, a still greater quantity of apotheme is dissolved, and a large amount of tannin becomes insoluble in cold water, and without medicinal virtue, in consequence of its combination with the dissolved starch, or by the action of the atmosphere converting it into apotheme. Hence, the decoction, and the extract formed from it, contain much less soluble and active matter, than that from the cold infusion, and are therefore ineligible preparations. By displacement, cold water removes all the astringent virtues of rhatany, forming a clear deep-red infusion, from which an active and almost perfectly soluble extract may be obtained by careful evaporation. Alcohol takes up but little more of its astringent principle than cold water, with much inert matter. Rhatany root consists of tannin in

a state of purity, in a state of apotheme, deprived of its astringency, and insoluble from the action of the air, and in a state of extractive or a combination of tannin and apotheme, also lignin, an acid termed *Krameric acid*, and small proportions of gum, starch, saccharine matter, etc. Its preparations are *incompatible* with the mineral acids, and most of the metallic salts.

Properties and Uses.—Rhatany is a powerful astringent, with some slight tonic virtues. It may be employed internally with advantage, in menorrhagia, hematemesis, passive hemorrhages, chronic diarrhea, leucorrhea, chronic mucous discharges, colliquative perspiration, and incontinence of urine. Also as an energetic styptic in epistaxis, hemorrhage from the cavity of an extracted tooth, or the surface of a wound, and as a local application to prolapsus ani, fissure of the anus and leucorrhea. As an application to spongy and bleeding gums, to redden and consolidate them, as well as to preserve the teeth, the following paste will be found unsurpassed: Take of prepared chalk, and powdered cinchona, of each, equal parts; combine them with a sufficient quantity of equal parts of the tinctures of rhatany and myrrh, to form a paste. Use daily with a brush. Dose of the powder from ten grains to thirty; of the tincture from one to four fluidrachms; of the infusion from one to four fluidounces; of the extract from ten to twenty grains.

Off. Prep.—Extractum *Krameriae*; Infusum *Krameriae*; Tinctura *Krameriae*.

LACTUCA SATIVA.

Lettuce.

LACTUCA VIROSA.

Strong-scented Lettuce.

Nat. Ord.—Asteraceæ; Cichoraceæ, *Lindley*. Compositæ Cichoraceæ, *De Candolle*. *Sex. Syst.*—Syngenesia Æqualis.

THE HERB, AND INSPISSATED JUICE—LACTUCARIUM.

Description.—*Lactuca Sativa* has an annual, tap-shaped root, with an erect, round stem, simple below, branching above, and about two feet in height. The lower leaves are obovate, rounded at the end, and undulating; the upper are smaller, sessile, cordate, and toothed; both are shining, and of a yellowish-green color. The flowers are pale-yellow, small, and disposed in an irregular terminal corymb. Before the flower-stem begins to shoot, the plant contains a bland, pellucid juice, has little taste or smell, and is much used as a salad for the table; but during the period of inflorescence it abounds in a peculiar milky juice, which readily escapes from incisions in the stem, and has been found to possess decided medicinal properties.

LACTUCA VIROSA has a tap-shaped *root*, with a solitary stem, two or three feet high, erect, round, smooth, sparingly leafy, scarcely branched; panicle at the top; a little prickly below. The *leaves* are horizontal, nearly smooth, finely toothed; radical ones numerous, obovate, undivided, depressed; those of the stem smaller, often lobed; arrow-shaped and clasping at their base; the midrib of all more or less beset underneath with prominent prickles; such as often occur on the margin also. *Flower-heads* numerous, panicle, with abundance of small, heart-shaped, pointed bracteas. *Involucral scales* downy at the tip, destitute of any keels or ribs. *Corolla* small, light-yellow. *Pappus* rough. There are many varieties of lettuce which differ much from each other; as an application to all of them, it may be said, that they have large, milky, frequently wrinkled *leaves*, usually of a pale-green, but varying to a light-red. The radical leaves are roundish and toothed at the margin; those of the stem obovate or cordate. The *stem* is round, leafy, corymbiform at top, with numerous bright-yellow *flowers*.

History.—The native country of this plant is unknown; but it is cultivated in all parts of the civilized world. The *Lactuca Elongata* of our country, was presumed for a time to possess narcotic principles similar with the others, but on investigation it has been ascertained to be nearly if not entirely inert. *Lactucarium* or lettuce-opium is obtained from these plants, by cutting across their stems, at the time of inflorescence, when a milky fluid exudes from the surface of the cut; this is absorbed by cotton or a piece of sponge, and is pressed out into a small vessel, when, by exposure to the air, it concretes. By making another cut at a short interval below the first, and so proceeding six or seven times daily, or even oftener, the whole juice of the plant may be obtained. There are several other modes recommended for procuring the lactucarium, but no one of them obtains an article equal to that collected by the above plan. After the middle period of inflorescence, the juice becomes thicker but deteriorated in its medicinal principles. A single plant of *L. Sativa* is said to yield seventeen grains of lactucarium, while a plant of *L. Virosa* gives fifty-six grains. As found in the shops, lactucarium is in roundish, compact, rather hard masses, weighing several ounces, of a reddish-brown color externally, of a bitter, narcotic and somewhat acid taste, and an odor approximating that of opium. It is asserted that two other varieties, the *L. Scariola*, and *L. Altissima*, furnish a superior article of lettuce-opium.

Lactucarium does not attract moisture from the atmosphere; is softened by heat, and at a high temperature burns with a large white flame. Cold water takes up about a sixth of it, forming a deep-brown infusion; boiling water a third, and proof spirit, alcohol and ether a much larger proportion. The addition of acetic acid to water or alcohol improves their solvent powers upon this article. It contains neither morphia nor narcotine, but is found to consist of *lactucin*, volatile oil, a yellowish-red

tasteless resin, a greenish-yellow acrid resin, crystallizable and uncrystallizable sugar, gum, pectic acid, albumen, a brown basic substance, a principle like humus-extractive, a concrete oil or wax, one part of which is soluble in ether, and fusible only at 212° , and the other insoluble in ether and fusible at 167° , and numerous salts, particularly oxalates.

Lactucin is obtained by treating finely-powdered lactucarium with alcohol acidulated with one fifteenth of acetic acid, adding an equal volume of water, and precipitating the mixture with a slight excess of subacetate of lead; filter the solution and free it from the lead by sulphureted-hydrogen gas, filter, evaporate by a gentle heat not exceeding 144° —treat the extract with absolute alcohol, then distil it off, and again exhaust with ether, which by distillation or spontaneous evaporation, forms crystals of an obscure acicular character. When pure they are colorless, inodorous, intensely bitter, easily fusible, soluble in sixty or eighty parts of cold water, more soluble in ether, still more so in alcohol, and easily soluble in acids, especially acetic acid, but without neutralizing them. In regard to this being the active principle of lactucarium, there is yet much dispute; several analysts have differed in their results and conclusions. The most recent analysis is by Ludwig, who in connection with several other principles, obtained *lactucic acid* and *lactucin*. “To obtain these principles, eighty parts of lactucarium in fine powder, were triturated with eighty of pure cold diluted sulphuric acid, and then mixed with four hundred parts of alcohol of 0.851; the liquor was filtered, shaken with hydrate of lime till it yielded no precipitate with baryta-water or oxalate of potassa, then decolorized with pure animal charcoal, and evaporated; the brown tenacious mass, thus obtained, (alcoholic extract) was treated with boiling water, which left behind a viscid substance; the aqueous solution was treated with animal charcoal, and on being evaporated yielded a mixture of lactucic acid and lactucin; these were separated by dissolving the mixture in boiling water, which on cooling deposited the latter in white crystalline scales, and gave up the former upon subsequent evaporation. *Lactucic acid* is of difficult crystallization, light-yellow, strongly bitter, without sour taste, of an acid reaction, and readily soluble in alcohol and water. It has as much claims as any other discovered substance to be considered the active principle of lactucarium. *Lactucin*, purified by animal charcoal, is in white pearly scales, the solution of which exhibits no reaction with subacetate or acetate of lead, or solution of iodine. It is dissolved without change of color by concentrated sulphuric acid.” *Thridace*, is the inspissated expressed juice obtained by collecting the stalks near the flowering period, depriving them of their leaves, and then subjecting them to pressure.

Properties and Uses. — Lactucarium has never been thoroughly and satisfactorily investigated in relation to its therapeutical influences; indeed, various experimenters differ in their views on this point, some

asserting it to be a stimulant and others a sedative. It is, when employed at all, usually given as a calmative and hypnotic, and as a substitute for opium, to which it is to be preferred in many instances, on account of its freedom from unpleasant after-effects, as constipation, excitement of the brain, etc. However, it is not considered equal in power to opium. The most energetic lactucarium is said to be obtained from *L. Virosa*, and *L. Altissima*. Moderate doses of it act as a narcotic poison on the lower animals, and ten or twenty grains swallowed by a dog will cause sleep, or the watery solution injected into a vein occasions sleep, coma, and death. Dose of lactucarium in pill or powder, which is the most efficient mode of administration, from five to twenty grains; of the tincture, thirty to sixty drops; of the alcoholic extract, one to five grains. The article is seldom used in medical practice on account of its high price, its uncertain power, and its liability to adulteration.

LARIX AMERICANA.

American Larch.

Nat. Ord.—Pinaceæ or Coniferæ. *Sex. Syst.*—Monœcia Monadelphia.

THE BARK.

Description.—This is the *Pinus Pendula*, *Pinus Microcarpa*, and *Abies Americana* of various botanists, and is known by the several names of *Black Larch*, *Tamarac*, *Hackmetack*, etc. The tree has a straight and slender *trunk*, with slender horizontal branches and attains the height of eighty or a hundred feet. The *leaves* are short, one or two inches long, very slender, almost thread-form, soft, deciduous, without sheaths and in fascicles of from twenty to forty, being developed early in the spring from lateral scaly and globular buds, which produce (the same or the second year) growing shoots on which the leaves are scattered. The *cones* are oblong, of few rounded scales, inclining upward, from half an inch to an inch in length, and of a deep purple-color. *Scales* thin and inflexed on the margin. *Bracts* elliptical, often hollowed at the sides, abruptly acuminate with a slender point, and together with the scales, persistent.

History.—This is a beautiful tree, more common throughout New England; it is found in swamps and moist places, and flowers in April and May. It may be distinguished from the pines, by the branches being without leaves for nearly half the year. Its wood is very heavy, strong and durable, and is the most valuable of all the pines or spruces. The bark is the part used as medicine.

Properties and Uses.—A decoction of the bark of this tree is said to be laxative, tonic, diuretic, and alterative, and is recommended in obstructions of the liver, rheumatism, jaundice, and some cutaneous diseases; a decoction of the leaves has been employed, in piles, hemopt-

sis, menorrhagia, diarrhea and dysentery, and externally in cutaneous diseases, ulcers, burns, etc. In dropsy, combined with spearmint, juniper berries and horseradish, it has proved valuable. Dose of decoction, from two to four fluidounces, two to four times a day.

Off. Prep.—Tinctura Pinus Pendulæ Composita.

LAURUS SASSAFRAS.

Sassafras.

Nat. Ord.—Lauraceæ. *Sex. Syst.*—Enneandria Monogynia.

THE BARK OF THE ROOT.

Description.—This is a small indigenous tree, varying in height from ten to forty feet, and having a trunk about a foot in diameter, covered with a rough, deeply-furrowed and grayish bark—that on the twigs, however, being smooth and beautifully green. The *leaves* are alternate, petiolate, membranous, bright-green, smooth above, finely downy beneath, especially when young, very variable in form, from ovate and entire to three-lobed, or lobed only on one side, all, however, tapering to the base. The greater number are three-lobed, and their mean length is four or five inches. The *flowers* appear before the leaves, are frequently diœcious, small, of a pale greenish-yellow color, and are arranged in naked, downy corymbose racemes which are terminal and axillary, and have subulate, deciduous bracts at their base. The *calyx* is six-parted, permanent at base. The *sterile flowers* have nine stamens, the *fertile* only six with a simple style. The *fruit* is an oval drupe of a deep-blue color when ripe, about as large as a pea, and supported in the permanent base of the calyx on the thick, red, clavate peduncle.

History.—Sassafras is a well-known tree growing throughout the United States, and extending into Mexico, and flowering in the latter part of April or early in May. Its flowers have a weak, agreeable odor, and are, as well as the twigs, much used in domestic practice, in decoction, as a purifier of the blood in spring. The officinal parts are the bark and the pith. The root is largely exported, it consists of a brownish-white wood, and an external spongy bark, both of which are recognized as officinal by the foreign authorities. The bark of the root, is the part generally employed in this country, it is by far the most active part of the whole tree. It is found in the shops, in small irregular pieces, of a grayish-brown color on the surface, rusty-brown within, very brittle, of an agreeable odor, and a powerful, peculiar, warm, aromatic, sweetish taste. It owes its properties to a volatile oil, which may be separated by distillation with water. Hot water, in infusion, or alcohol takes up its active properties, but boiling dissipates them. The bark contains a heavy and light volatile oil, camphorous matter, fatty matter, resin, wax, a principle resembling tannic acid, called *Sassafrid*,

tannic acid, gum, albumen, starch, red coloring-matter, lignin, and salts. The *pith* of the extremities of the branches is in light, spongy, slender, and cylindrical pieces, with a mucilaginous, slightly sassafras-flavored taste. It is full of gummy substance, affords a clear but viscid mucilage in water, much less tenacious than that of gum arabic, and which is not affected by alcohol.

Properties and Uses.—Sassafras is a warm aromatic stimulant, alterative, diaphoretic, and diuretic. It is generally used in combination with other alteratives whose flavor it improves, in syphilitic affections, chronic rheumatism, scrofula, and many cutaneous eruptions. The mucilage of the pith is used as a local application in acute ophthalmia, and as a demulcent drink in disorders of the chest, bowels, kidneys, and bladder. The oil is used to afford relief in the distressing pain attending menstrual obstructions, and that following parturition, in doses of from five to ten drops, on sugar; also used in diseases of the kidneys and bladder. Externally, as a rubefacient, in painful swellings, sprains, bruises, rheumatism, etc., and is said to check the progress of gangrene.

Off. Prep.—Infusum Sassafras Medullæ; Lotio Sassafras; Pilulæ Saponi Compositæ; Syrupus Sarsaparillæ Compositus.

LAVANDULA VERA, AND LAVANDULA SPICA.

Lavender.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE FLOWERS.

Description.—*Lavandula Vera*, of De Candolle, is a small shrub generally one or two feet high, but sometimes growing to even six feet. The *leaves* are oblong-linear, or lanceolate, entire, opposite, sessile, tapering to the base, when young hoary and revolute at the edges; upper ones linear-lanceolate, the highest shorter than the calyx and the lower petiolated. The *flowers* are of a lilac color, small, in terminal, cylindrical spikes consisting of interrupted whorls, in which the florets are from six to ten, each whorl being furnished with two small, ovate bracts. The *corolla* is tubular, and divided into two lips, the uppermost of which is larger and bifid, the lower declining, and of three segments. The *stamens* are four, with small, simple anthers. The *style* is slender, and covered by a bilobate stigma.

LAVANDULA SPICA of De Candolle is more dwarfish and more hoary than the last. The *leaves* are oblong-lanceolate, somewhat spatulate, entire, much narrowed at the base, hoary on both sides. *Spikes* somewhat interrupted. *Bracts* linear-subulate, shorter than the calyx. This plant is not used in medicine, but yields what is called *Oil of Spike*, much used in the preparation of artistical varnishes and by porcelain painters.

History.—*Lavandula Vera* is a native of the south of Europe, growing in dry, barren lands. It is extensively cultivated in this country, and flowers in July and August. When too thickly planted, the plant suffers from a disease which is removed by thinning them. All parts of the plant are aromatic, but the flowers only are officinal; they are cut when they begin to bloom, and dried in the shade. They have a rich, peculiar fragrance, which is retained long after drying, and a strong, bitter, aromatic, somewhat camphoraceous taste. Alcohol extracts their virtues, which probably depend upon their volatile oil, from half a drachm to two drachms of which may be obtained from a pound of the fresh flowers.

Properties.—Lavender is an aromatic stimulant and tonic, but is seldom given in its crude state, but in its officinal preparations, which see.

Off. Prep.—*Oleum Lavandulæ*; *Tinctura Lavandulæ Composita*.

LEDUM LATIFOLIUM.

Labrador Tea.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—*Ledum Latifolium* is an evergreen shrub, with an irregularly branched stem from two to five feet in height; the branches are woolly. The leaves are alternate, sub-sessile, entire, one or two inches in length, and nearly one-third as wide, obtuse, elliptical or oblong, smooth above, clothed with a dense, rusty wool beneath, with revolute or replicate margins. The flowers are large, white, in dense terminal corymbs of about a dozen flowers; pedicels nearly as long as the leaves, filiform, pubescent. Calyx very minute. Corolla white, and consists of five spreading, obovate, obtuse petals. Stamens five or ten, as long as the petals; filaments slender, smooth; anthers small, opening by two simple terminal pores. Ovary roundish; style straight, about as long as the stamens; stigma small, obtuse. Capsule ovate-oblong, subpubescent, five-celled, five-valved; valves splitting from the base upward, with the margins inflexed and connivent; receptacles linear, extending into the cells of the capsule. Seeds minute, terminating in a membrane at each extremity.

History.—This plant is a native of North America, and is found in the northern parts of the United States and in Canada, growing in cold bogs, and damp mountain woods, flowering in June and July. It is also found in the mountainous regions of more southern latitudes. The leaves have a pleasant odor and taste, and were substituted for tea-leaves during the revolutionary war. Its virtues are extracted by water in infusion, and alcohol.

Ledum Palustre or Marsh Tea, inhabiting swamps and wet places in the northern parts of Europe, Asia, and North America, may be known

by its linear leaves, having uniformly ten stamens, and especially by its oval pods. The leaves have a balsamic odor, and an aromatic, camphorous, bitter taste, and contain among other ingredients, volatile oil and tannin. Water by infusion, or alcohol extracts its properties.

Properties and Uses.—*Ledum Latifolium* is pectoral and tonic; and is useful in coughs, irritations of the pulmonary membranes, and in dyspepsia. Reputed also to possess similar but less energetic properties than the *Ledum Palustre*, which is supposed to possess narcotic powers. An infusion of the leaves has been successfully employed in decoction in pertussis, dysentery, and to allay irritation in exanthematous diseases. In leprosy, scabies, and various cutaneous affections, the decoction internally and externally has been beneficially used. When placed among clothes, they are said to prevent the attacks of moths. A strong decoction, used externally, will kill lice and other insects. Dose of the infusion of either of the above plants, from 2 to 4 fluidounces, 3 or 4 times a day.

Off. Prep.—Infusum Ledi.

LEONURUS CARDIACA.

Motherwort.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE TOPS AND LEAVES.

Description.—*Leonurus Cardia* is a perennial plant, with stems from two to five feet in height, wand-like, minutely downy, acutely quadrangular, with intermediate channels, purplish, and beset with numerous pairs of opposite, long-stalked, rough, dark-green, somewhat downy leaves, arranged in four vertical rows. The lower stem-leaves are palmate-lobed, and broadest; the upper ones acutely three-lobed; those about the summit lanceolate and undivided; all of them toothed, cuneiform at base. The flowers are purplish or whitish-red, and are disposed in numerous, axillary whorls. *Calyx* rigid and bristly. *Corolla* purplish, the upper lip clothed with dense, white, shaggy, upright hairs; the lower deeply colored, variegated, smooth, in three nearly equal entire lobes; the middle lobe obcordate. *Stamens* didynamous; *anthers* approximated in pairs, with parallel transverse cells and naked valves, and sprinkled with shining dots. *Achenia* oblong, ribbed, and roughened on the ribs, the apex prolonged into a very slender thread-like beak, bearing the pappus of copious soft and white capillary bristles.

History.—Motherwort is an exotic plant, but extensively introduced into this country, growing in fields and pastures, and flowering from May to September. It is supposed to be a native of Tartary, and may probably be indigenous to the northern sections of this country. After blossoming, the inner involucre closes for a time, the slender beak elongates and raises up the pappus while the fruit is forming; the whole involucre is then reflexed, exposing to the wind the naked fruits with

the pappus displayed in an open globular head. The root sends forth a number of small, long fibers of a dark-yellowish color. The whole plant is officinal. It has a peculiar, aromatic, not disagreeable odor, and a slightly aromatic, bitter taste, and yields its properties to water or alcohol. The plant has not been analyzed.

Properties and Uses.—Motherwort is emmenagogue, nervine, antispasmodic and laxative. It is usually given in warm infusion in amenorrhœa from colds; and in suppressed lochia, we have found it superior to any other remedy. Likewise useful in hysteria. The extract is recommended in nervous complaints, pains peculiar to females, in irritable habits, delirium tremens, typhoid stages, with morbid nervous excitability, all chronic diseases attended with restlessness, wakefulness, disturbed sleep, spinal irritation, and neuralgic pains in the stomach and head, and in liver affections. Combined with Ictodes and Cimicifugin, it forms a superior antispasmodic, nervine and emmenagogue. Externally, it may be used as a fomentation to the bowels, in suppressed or painful menstruation, etc. Dose of decoction, from two to four fluidounces, every one, two or three hours; of the extract, from three to six grains, every two or four hours. The root in infusion is diuretic. The seeds have been given in half teaspoonful doses in water, in bilious colic, and, it is said, will pass through the bowels when quicksilver will not; they must not be pulverized. This, however, requires more satisfactory evidence.

Off. Prep.—Decoctum Leonuri; Extractum Leonuri Hydro-alcoholicum; Pilulæ Leonuri Compositæ.

LEPTANDRA VIRGINICA.

Leptandra.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Diandria Monogynia.

THE ROOT.

Description.—This is the *Veronica Virginica* of Linnæus, and is known also by the names of *Culver's Physic*, *Tall Speedwell*, *Blackroot*, etc. It is an indigenous, perennial plant, with a simple, straight, smooth herbaceous stem, from two to five feet in height. The leaves are whorled in fours to sevens, short-petioled, lanceolate, acuminate, finely serrate, and glaucous beneath. The flowers are white, numerous, nearly sessile, and disposed in long, terminal, and verticillate, sub-terminal spikes. Spikes paniced, crowded; bracts very small. Calyx four-parted. Corolla small, nearly white, with a deeply four-cleft, spreading border, the lateral or lower segments narrower than the others, tubular, pubescent inside; tube of the corolla longer than its limb and much longer than the calyx. Stamens two, very much exserted. Capsule oblong-ovate, not notched, opening by four teeth at the apex, many-seeded.

History.—This plant grows throughout the United States, in limestone countries, and in rich moist places, woods, thickets and barrens, and

flowers in July and August. The root is perennial, horizontal, irregular, woody, about as thick as the finger, from six to twelve inches long blackish externally, brownish internally, with many long slender, dark fibers, issuing horizontally in every direction. It is the officinal part, and should be gathered in the fall of its second year. When fresh it has a faint odor and a bitter, nauseous taste, which is somewhat lessened by drying, and yields its active properties to boiling water, or still better to alcohol. Age impairs its virtues. It has not been satisfactorily analyzed, but is said to contain an essential oil, bitter extractive, tannin, gum, resin, and woody fiber.

Properties and Uses.—The fresh root is too drastic and uncertain for medicinal use, producing vomiting, bloody stools, dizziness, vertigo, and in pregnant females, abortion, unless used with much care. A decoction or extract of the fresh root is highly recommended in intermittent fever; my former colleague, Prof. Powell, who has tested it, states that it removes the disease, and leaves the system in a condition to repel a fresh attack or relapse; but it must be used with caution, as it is apt to produce unpleasant symptoms. The dried root is laxative, cholagogue and tonic; and is employed with much success in all hepatic affections, as it causes the liver to act with great energy, and without active catharsis. In all febrile diseases it is an excellent laxative, and may be given daily in tablespoonful doses of the infusion, repeated every hour, until one or two moderate evacuations are procured; it is peculiarly applicable to bilious and typhoid fevers, causing discharges of a black, tarry and morbid character, without debilitating the tone of the bowels or of the general system. It has been successfully employed in leprosy and cachectic diseases, and its effects in these instances, may, probably, be owing to its influence on the biliary apparatus. As a laxative and tonic in small doses, it is very valuable in dyspepsia, especially when connected with an inactive condition of the liver, and torpid and debilitated bowels, likewise in all functional diseases of the liver, as above remarked. It exerts a powerful influence upon the absorbent system, and in combination with cream of tartar, has been successfully used in obstinate cases of dropsy. In diarrhea and dysentery, it has proved very beneficial as a cathartic, one active dose frequently effecting a cure. By some it is said to possess narcotic properties, and that, during its operation, it will frequently be necessary to rouse the patient lest he fall into a deep sleep. I have never witnessed this effect. Dose of the powdered root as a cathartic, from twenty to sixty grains, which may be given in sweetened water; of the infusion, in typhoid stages, half a fluidounce every hour, until it operates, and to be repeated daily. Dose of the hydro-alcoholic extract, which is its best form of administration, from one to five grains in form of pills.

Off. Prep.—Extractum Leptandræ Hydro-alcoholicum; Extractum Leptandræ Fluidum; Leptandrin; Tinctura Leptandræ.

LEPTANDRIN.

Leptandrin.

THE RESINOUS PRINCIPLE OF LEPTANDRA VIRGINICA.

Preparation.—Leptandrin may be prepared as follows: Take of coarsely-powdered Leptandra any quantity, alcohol 90 per cent., a sufficient quantity. By percolation, obtain a saturated tincture. Place the tincture in a still, and distil off the alcohol, and while hot add the residuum slowly and gradually to cold water, equal to two or three times its volume. Allow this to stand for seven or eight days, when the resinous matter will precipitate to the bottom of the vessel in a semi-liquid mass, while the water will hold in solution most of the extractive and coloring matter. Remove this water, and to the residue add a fresh supply of cold water, subjecting it to another washing. Then carefully remove the water, after having allowed all the resinous matter to precipitate, which last must be dried in shallow tin or porcelain plates by a moderately-continued heat, until it becomes perfectly friable on cooling, and which generally requires several days. In the preparation of this article, high-proof alcohol must be employed, on account of the large amount of extractive matter present, which is soluble in water, and which, according to the proportion of water present in the tincture, prevents the precipitation of the leptandrin. Care must be taken likewise in the application of heat, as too great a heat, say above 175° or 180° will render the precipitate inert, or materially affect its character. The above is the process usually employed in the preparation of leptandrin; it may be obtained, however, by adding the tincture to four times its weight of water, distilling off the alcohol, and setting aside the residue for several days, until all the leptandrin precipitates. Remove the water, and dry the precipitate as above, having previously washed it in fresh water to remove extractive, etc. Roots of the second year's growth, are said to afford the most leptandrin.

History.—Leptandrin, according to its mode of preparation, is a jet-black resinous substance, resembling pure asphaltum, or of a grayish-brown color, with a peculiar, faint cyanic smell and taste, somewhat bitter, but not disagreeable. In its aggregate form, it has a vitreous fracture, is unalterable in a dry atmosphere, and is without acid or alkaline reactions. Its powder has a black, glistening, soot-like appearance, and coalesces in a warm and moist air. When first made it is soluble in alcohol, though as with many other resins upon exposure to atmospheric influence, it becomes imperfectly soluble in alcohol, but perfectly so upon the addition of aqua ammonia. It is insoluble in water, but the addition of liquor potassa or aqua ammonia, renders it completely soluble, from which solutions it is precipitated by acids. Ether takes up a portion of it, and aqua ammonia added perfectly dissolves it, leaving

the ether floating above of a light reddish-yellow color. It is lighter than chloroform, and is insoluble in it. Spirits of turpentine takes up a small portion, forming a dirty-white liquid; acetic acid likewise dissolves a small proportion. None of the above agents have been tried with heat. Nitric acid turns leptandrin a brownish-yellow color; muriatic acid, a light yellowish-green; and sulphuric acid, reddish-brown. Heat semi-liquefies it, and it burns with a bright white flame, giving out a sweet, balsamic, rather agreeable odor, somewhat resembling balm of Gilead buds when burned, or incense. This valuable agent was first prepared and introduced to the profession by W. S. Merrell, of Cincinnati.

Properties.—Leptandrin is a powerful cholagogue, with but slight laxative influence; except given in very large doses its cathartic powers are but very feeble. It is one of the most efficacious and important agents among those peculiar to Eclectic practice, being the only known medicine that efficiently stimulates and corrects the hepatic secretions, and functional derangements of the liver, without debilitating the system by copious alvine evacuations. It may be safely and efficaciously employed in the treatment of diarrhea, cholera-infantum, some forms of dyspepsia, typhoid fever, and all diseases connected with biliary derangements. Combined with podophyllin it is a prompt and effectual remedy in epidemic dysentery, often effecting a permanent cure in from twelve to eighteen hours; in dysentery with irritable bowels, it may be used alone with advantage, or combined with camphor, as in such cases its union with podophyllin is contra-indicated. In intermittents it renders the action of quinia, when united with it, more certain, and prevents the liability to a return of the disease, at least for the season, and is likewise highly beneficial in infantile remittent fever, and in periodic diseases generally, of an obstinate character, in which quinia alone seems to produce but little or no result. It may also be used in many other combinations with much advantage, as with Hydrastin, or dried beef's gall, in some dyspeptic affections, jaundice, piles, etc., or with Iridin, Baptisin, Phytolaccin, Corydallin, Caulophyllin, and other active principles, in various forms of disease. Dose of Leptandrin, from one-half of a grain to five or six grains, every three or four hours, according to the action or effect desired. Some practitioners neglect the use of this agent, because it does not act so powerfully as podophyllin, and hence lose the influence of a very important remedy in functional derangements of the liver, and other organs essential to digestion. In relation to this article, Prof. Hill observes:

“This is not strictly speaking a cathartic. It is aperient, alterative, and tonic. Its effects on the liver are peculiar. In cases of children afflicted with summer complaint, where there is evidently a lack of the proper biliary secretion, but where, owing to the already irritated condition of the bowels, the ordinary medicines for arousing the liver are

inadmissible, this article seems to be the very thing needed. While it acts freely upon the liver, instead of purging it seems only to change the discharges from the light and watery or slimy condition, to a darker and apparently bilious state, rendering them more and more consistent, until they become perfectly natural, without having been arrested entirely, or at any time aggravated. It at the same time seems to act as a tonic, restoring the tone of the stomach and increasing the strength and activity of digestion. It is a most valuable remedy in dyspepsia.

"The dose is from one-fourth to one grain every one or two hours in acute cases, and from one to two grains three times a day in chronic cases. It is valuable to combine with Podophyllin as a remedy in dyspepsia and chronic hepatitis.

"In the epidemic dysentery, which has prevailed for the past two seasons, in many parts of our country, this article has been of great service. It was usually given with the best success after evacuating the bowels freely, with a combination of Podophyllin and Leptandrin or Rhubarb. For this purpose, give from one-half of a grain to one grain every hour, gradually lengthening the intervals as the discharges become darker. Though it may not be applicable in all cases of dysentery, it is doubtless one of the most useful articles in this dangerous disease."

In cholera-infantum, a disease which sometimes sets at defiance all the skill of the physician, I have met with excellent success by the following combination: Take of Leptandrin six grains, Quinia three grains, Camphor one grain and a half, Ipecacuanha three-fourths of a grain. Mix and divide into twelve powders, of which one may be given every two or three hours, and its use continued thus for several days. Its action at first is to increase the alvine passages and apparently augment the disease, but in a few days the character of the evacuations change, become more and more normal, as well as more regular in their appearance; after which, one or two powders per day for a week, will render the cure permanent. This powder, in large doses for adults, will be found very efficacious in painful diarrhea and dysentery, as well as in severe pains depending upon intestinal irritation. The following has also been of advantage in cholera-infantum: Triturate together, Charcoal one drachm, with Leptandrin three grains, and divide into twelve powders, of which one powder is to be given every two or three hours until the evacuations become more natural, after which, give one or two powders a day for a few days.

Off. Prep.—Pilulæ Baptisiæ Compositæ; Pilulæ Leptandrini Compositæ; Pulvis Leptandrini Compositus.

LIATRIS SPICATA.

Button Snakeroot.

Nat. Ord.—Asteraceæ. Sex. Syst.—Syngenesia Æqualis.

THE ROOT.

Description.—This plant, also known by the names of *Gay-feather*, *Devil's-bit*, etc., has a perennial, tuberous root, and an erect, annual stem from two to five feet in high, mostly stout and very leafy. The leaves are linear, glabrous, alternate, punctate, ciliate at base, the lower ones from three to five-nerved, and narrowed at base. The flowers are sessile, and of a bright-purple color; the heads are many and densely crowded in a long, terminal spike, and from eight to twelve-flowered. Scales of the cylindrical bell-shaped involucre oblong or oval, appressed, with slight scarious margins. Achenia pubescent, obconic. Pappus permanent, colored, barbellate, not evidently plumose to the naked eye. Receptacle naked. This plant is found in moist places in the middle and southern states, and is found in abundance in the prairies.

LIATRIS SQUARROSA or Blazing Star, has also a perennial tuberous root, with a stem two to three feet high, thickly beset with long-linear, nerved leaves, the lower ones being attenuated at the base. The heads are few, sessile or nearly so, with brilliant purple flowers; racemes flexuous, leafy, involucre ovate-cylindric; scales of the involucre large, numerous, squarrose-spreading, outer ones larger, leafy, inner ones mucronate-acuminate, scarcely colored. Pappus plumose. This plant is likewise found in the middle and southern states, growing in dry soil, and is known in the south by the name of *Rattlesnake's Master*.

LIATRIS SCARIOSA or *Gay-feather*, has a perennial, tuberous root, with a stout, scabrous-pubescent stem, from four to five feet in high, and whitish above. The leaves are numerous, lanceolate, tapering at both ends, glabrous, with rough margins, entire, lower ones on long petioles and from three to nine inches long, upper ones from one to three inches in length, by from one to three lines in width. Heads from five to twenty, an inch in diameter, in a long raceme, with from twenty to forty purple flowers. Involucre globose-hemispherical; scales of the involucre obovate or spatulate, very obtuse, with dry and scarious margins, often colored. Pappus scabrous. This plant is found in dry woods and sandy fields from New England to Wisconsin, and extending southward.

History.—All the above plants are splendid natives, and flower through August and September. There are several other species of this genus which appear to possess medical properties analogous to each other, and which deserve further investigation, as the *L. Odoratissima*, *L. Cylindracea*, *L. Graminifolia*, etc. The roots are the officinal parts; they are all tuberous, with fibers of an acrid, bitterish, pungent taste, and an aromatic, terebinthinate odor, which properties are owing to the presence

of a peculiar balsamic resin; water partially extracts its virtues, but alcohol, wholly. They have not been analyzed. The resin obtained from them might, probably, prove a valuable agent.

Properties and Uses.—These plants are diuretic, with tonic, stimulant, and emmenagogue properties. A decoction of them is very efficacious in gonorrhea, gleet, and nephritic diseases, in doses of from two to four fluidounces, three or four times a day; it is also reputed beneficial in scrofula, dysmenorrhea, amenorrhea, after-pains, etc. It is likewise of advantage in sore-throat, used as a gargle, and in injection has proved useful in leucorrhea. Said to be beneficial in Bright's disease, in connection with *Lycopus Virginicus* and *Aletris Farinosa*; equal parts of each in decoction. These plants are celebrated for their alexipharmic powers in bites of venomous snakes; Rush states, that when bitten, the inhabitants of the Southern States bruise the bulbous roots, and apply them to the wound, at the same time drinking freely of a decoction of them in milk. This requires corroboration.

Off. Prep.—Decoctum Liatris.

LIGUSTRUM VULGARE.

Privet.

Nat. Ord.—Oleaceæ. *Sex. Syst.*—Diandria Monogynia.

THE LEAVES.

Description.—This plant, also called *Privy*, *Prim*, etc., is a smooth shrub, growing five or six feet high, with wand-like branches. The leaves are dark-green, one or two inches in length, and about half as wide, opposite, entire, smooth, lanceolate and obovate, obtuse or acute, and on short petioles. The flowers are small, numerous, white, and disposed in tetramerous, thyrsoïd, terminal panicles. *Calyx* minutely four-toothed, deciduous, short-tubular; *corolla* funnel-form, tube short, limb with four spreading, ovate, obtuse lobes. *Stamens* two, on the tube of the corolla; *anthers* large, exserted. *Style* very short; *stigma* two-cleft. *Berries* spherical, black, in conical bunches, two-celled, and from two to four-seeded; *seeds* convex on one side, angular on the other.

History.—Privet is found growing wild in woods and thickets, and along the roadsides from New England to Virginia, and West to Missouri, flowering in May and June. It is used in England for hedges, from which place it is supposed to be introduced; but it is indigenous in Missouri. It is often cultivated in gardens. The leaves are the officinal parts; they have but little odor, but an astringent, bitter taste. Water or alcohol extracts their virtues. They have not been analyzed.

Properties and Uses.—Privet leaves are astringent; a decoction of them is very valuable in chronic bowel complaints, ulceration of stomach

and bowels, as a gargle for ulcers of mouth and throat, and as an injection for ulcerated ears with offensive discharges, leucorrhœa, gleet, and ulceration of the bladder, likewise in diabetes. They may be employed either in decoction or powder. Dose of the powdered leaves, from thirty to sixty grains, three times a day; of the decoction, from two to four fluidounces. The flowers have been employed for similar purposes with the leaves. The berries have a sweetish bitter taste, are reputed cathartic, and to color the urine brown; they have been used for dyeing. Probably the bark will be found equal, if not superior in efficacy, to the leaves. On analysis it was found to contain a peculiar substance called ligustrin, also sugar, mannite, muco-saccharine matter, starch, chlorophylle, bitter extractive, bitter resin, tannin, albumen and salts. It is deserving further attention.

Off. Prep.—Decoctum Ligustri.

LILIUM CANDIDUM.

Meadow Lily.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE ROOT.

Description.—This plant has a perennial root or bulb, consisting of imbricated fleshy scales, from which arises a thick *stem* from three to four feet in height. The *leaves* are scattered lanceolate, and narrowed at the base. The *flowers* are large, snow-white, campanulate, smooth inside, and disposed in a terminal raceme.

History.—This is an exotic, a native of Syria and Asia Minor, and is much cultivated in this country on account of its beautiful white flowers, which have long been regarded as the emblems of purity, and which appear in June and July. The bulb is the part used, it is inodorous, but has a peculiar, disagreeable, somewhat bitter and mucilaginous taste. It contains a large proportion of mucilage, and a small quantity of an acrid principle which is dissipated by heat. Water extracts its virtues.

Properties and Uses.—Meadow Lily, or *White Lily* as it is sometimes called, is mucilaginous, demulcent, tonic, and astringent. Useful in leucorrhœa and prolapsus uteri, the decoction taken internally, and employed in injection; it is more decided in its effects, when combined with life-root (*Senecio Gracilis*). Boiled in milk, it forms an excellent poultice for ulcers, external inflammations, tumors, etc. The recent root is stated to have been useful in dropsy. The flowers have an agreeable odor, which is imparted to oil or lard; and a liniment or ointment is sometimes prepared from them, and used as a soothing application in external inflammations. The petals contain a fragrant oil, which has been thought beneficial in earache, and uterine pains.

LINUM USITATISSIMUM.

Flaxseed.

Nat. Ord.—Linaceæ. *Sex. Syst.*—Pentandria Pentagynia.

THE SEEDS.

Description.—Flax is an annual plant, very smooth, with a slender fibrous root, and one or more erect, slender, delicate, and round stems, one or two feet high, and branching at the top. The leaves are small, alternate, sessile, lanceolate, acute, entire, three-veined, and of a pale-green color; the lowermost short and blunt. The flowers are several, large, of a delicate-blue color, erect, and disposed in a terminal corymbose panicle, and are supported on long peduncles. The calyx is persistent, and has five lanceolate, erect sepals, which are three-nerved at base, and imbricated in æstivation. The corolla consists of five thin, delicate, crenate, oblong or obovate, striated petals, readily dropping off, glossy, broad above, narrow below, and contorted in æstivation. The stamens are five, subulate, erect, as long as the calyx, united at base, and supporting two-celled sagittate anthers. The ovary is superior, ovate, and surmounted by five blue, slender styles. The fruit is a globular capsule, about the size of a small pea, having the persistent calyx at the base, crowned with a sharp spine, having five cells containing two seeds each, divided from each other by a false dissepiment. Seeds elliptical, smooth, brown, and shining.

History.—The native country of Flax is unknown, though supposed to be derived from Egypt, or from Central Asia. It was known at a very early period, as it is mentioned in the ninth chapter, thirty-first verse, of Exodus, as growing in Egypt. At present it is naturalized in nearly all civilized countries. It flowers in June and July, and ripens its seeds in August. The seeds, as well as the oil they yield by expression are officinal. The seeds are small, oval, oblong, flattened on the sides with acute edges, somewhat pointed at one end, about a line in length, smooth, shining, of a brown color externally, and yellowish-white within. They are devoid of smell, and have an oily mucilaginous taste, and consist of a mucilaginous tegument and oleaginous cotyledons. When the teguments or husks are steeped in hot water, a peculiar gummy or mucilaginous matter is obtained, viscid, inodorous, and almost tasteless; alcohol added to this infusion forms a white flaky precipitate, and subacetate of lead affords a copious dense precipitate. In preparing the infusion the seeds should not be bruised as the mucilage resides only in their external coat. When flaxseed mucilage is dried it forms a brown gummy mass, containing in 100 parts, 52.70 of arabin or soluble gum, 29.89 of an insoluble azotiferous gummy principle, and 10.30 of moisture, and yields 7.11 per cent. of ashes. Vauquelin found in it free acetic acid, silica, and various salts of potassa and lime.

The internal portion of the seed, or nucleus, contains a peculiar oil, called *Linseed Oil*, and which is obtained from the seeds by expression without the aid of heat. It is rather thick, of a pale amber color, inclining to green, of a feeble, peculiar, disagreeable odor, and a nauseous taste. Its density varies from 0.927 to 0.934. It resists a cold of 4° F., without concreting; on exposure to the action of the air, it slowly becomes thicker, and gradually hardens into a firm elastic varnish—on which account it is highly useful in painting, in the formation of printers' ink, and other important applications. It boils at 600° F., is soluble in forty parts of cold alcohol, five of boiling, and in one part and a half of ether; becomes rancid with facility; and is saponified by the alkalies. When prepared on the large scale, the seeds are roasted before expression, in order to destroy the gummy matter contained in their tegument. *Oil Cake*, is the cake or refuse which remains after the expression of the oil, as it retains the mucilaginous matter of the husk, it is much used for fattening cattle. *Flaxseed Meal* is the seeds finely ground; it is of a dark-gray color, highly oleaginous, and when mixed with hot water forms a soft adhesive mass, much used by practical chemists for luting. Flaxseed, according to Meyer, contains fixed oil, wax, resin, extractive, gum, tannin, azotized mucilage, starch, albumen, gluten, and various salts.

Properties and Uses.—Flaxseed is used as a demulcent and emollient. Half an ounce of the seeds not bruised, infused in half a pint of boiling water, forms a mucilage which is very useful in urinary diseases, cough, catarrh, dysentery, and inflammatory affections of the lungs, intestines, and urinary passages. When not contra-indicated, the addition of lemon juice improves the flavor; it may be sweetened with loaf-sugar or honey. A decoction of flaxseed, or of flaxseed meal forms an excellent laxative enema; and the meal mixed with hot water forms an excellent emollient poultice. Dose of the infusion, one or two pints daily. Linseed oil in doses of two fluidounces twice a day, is said to have cured severe cases of piles within two or three weeks; while using it, liquors and stimulating diet are to be avoided. It is likewise reputed beneficial when internally administered in dysentery, colic, and lumbricus. Used as an enema it is advantageous in dysentery, hemorrhoids and ascarides; and combined with lime-water, it forms the Carron Oil, an excellent application to burns. One pint of linseed oil, combined with half an ounce each of oils of origanum and wintergreen, forms a pleasant cathartic; to be given in the same doses as castor oil. The oil is constituted of a large proportion of oleic acid, together with margaric acid and Glycerine.

Off. Prep.—Cataplasma Lini; Linimentum Calcis.

LIQUIDAMBAR STYRACIFLUA.

Sweet Gum.

Nat. Ord.—Altingiaceæ, *Lindley*. *Balsamaceæ*. *Sex. Syst.*—Monœcia Polyandria.

THE CONCRETE JUICE.

Description.—The Sweet Gum tree attains the height of from fifty to sixty feet, with a diameter of from three to five feet. It is covered with a gray, deeply furrowed bark, with corky ridges on the branchlets. The *leaves* are palmate, deeply five to seven-lobed, rounded, smooth and shining, of a rich green color; the *lobes* finely glandular, serrate and acuminate; the *veins* villous at their bases. When bruised the leaves are fragrant, and turn crimson or deep-red in autumn. *Sterile flowers* in several globular heads arranged in a conical cluster, naked or achlamydeous; *aments* monœcious, roundish, surrounded with a four-leaved involucre; *stamens* numerous, intermixed with minute scales; *filaments* short; *anthers* numerous, oblong, subsessile. *Fertile flowers* consist of two-celled ovaries, subtended by minute scales, all more or less cohering and hardening in fruit, forming a spherical catkin or head; *catkins* racemed, nodding, inclosed in the bud by a four-leaved deciduous involucre. *Styles* two, long. *Fruit* a kind of strobile, composed of the indurated scales and capsules. *Capsules* or pods two-beaked, two-celled, opening between the two awl-shaped or prickly diverging styles. *Seeds* small, several, amphitropous, with sparing albumen and a straight embryo; *cotyledons* foliaceous.

History.—This is a large and beautiful tree, with fine-grained wood, growing throughout the United States in moist woods from Connecticut and New Jersey, southward; but found in greater abundance in the Southern and Middle States. In warm latitudes, when wounded in the summer, a balsamic juice flows from its trunk; it is of the consistence of thin honey, more or less transparent, of a yellowish-white color, of a peculiar, agreeable, balsamic odor, and a bitter, warm, and acrid taste. It concretes into a soft resinous mass, assuming a darker color, and is known as *Sweet Gum*, or *Liquidamber* (Liquidum Liquidambar Styracifluæ). It is soluble in alcohol, oils, lard or fats. According to M. Bonastre, it contains a colorless volatile oil, a semi-concrete substance which rises in distillation and is separated from the water by ether, a minute proportion of benzoic acid, a yellow coloring substance, an oleo-resin, and a peculiar principle, insoluble in water and cold alcohol, for which he proposes the name of *styracine*. The proportion of benzoic acid is greatly increased by time.

Properties and Uses.—It probably possesses virtues similar to the concrete juice of *Styrax officinale*, which see. It makes an elegant and agreeable ointment when melted with equal parts of lard or tallow,

which I have found decidedly useful in hemorrhoids, psora, ringworm of the scalp, *porrigo scutulata*, and many other cutaneous affections; also in that indolent species of ulcer, known as "fever sores on the legs." In anal fistula, it maintains an increased discharge, softens the callosity of the walls of the sinus, and produces a normal result, and effects this without pain to the patient. If necessary, in fistula, a little creosote, or other stimulant may be added to it. This employment of sweet gum is not generally known, and Eclectics would do well to avail themselves of its use in the above diseases. It is also used in chronic catarrh, coughs, and pulmonary affections.

LIRIODENDRON TULIPIFERA.

Tulip Tree.

Nat. Ord.—Magnoliaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE BARK.

Description.—This tree is also known by the names of *Poplar*, *White Poplar*, *Yellow Poplar*, and *White-wood*. It is ordinarily about eighty feet high, with a diameter of two or three feet, but in favorable situations it frequently attains a height of one hundred and forty feet, with a diameter of eight or nine feet. The *trunk* is perfectly straight and cylindrical, and is covered with a bark of a brown or grayish-brown color, smooth when young, but rugged and furrowed when old. At the top it divides rather abruptly into coarse, crooked branches, in somewhat regular order, giving a symmetrical aspect to the tree; the bark of the young branches is bluish or of a reddish tinge. The *leaves* are large, bright green, alternate, on long petioles, smooth, shining, three lobed, the lateral lobes ovate, the middle one truncated and horizontally notched at its summit. In the larger leaves, the lateral lobes are furnished with a tooth-like projection, or additional lobe at some distance below their apex. There is a variety with the lobes of its leaves not pointed, but very obtuse. The *flowers* are large, solitary, terminal, tulip-shaped, variegated with different colors, greenish-yellow externally, orange within, and from four to six inches in diameter. *Bracts* two, triangular, falling off as the flower expands. The *calyx* is double, the inner and proper sepals being three, large, oval, concave, veined, of a pale-green color, spreading at first, but afterward reflexed. The *corolla* consists of six, seven, or more petals, which are obtuse, concave, veined, of a pale yellowish-green color, and marked with an irregular indented crescent of a bright orange on both sides toward the base. *Stamens* numerous, with short filaments, and long, linear, adnate anthers. The *pistil* is a large, conical, acute body, its upper half covered with minute, blackish, recurved stigmas; its lower furrowed, being a mass of coalescing styles and ovaries. The *fruit* consists of numerous, long, narrow scales,

attached to a common axis, imbricated in a conical form, attached at the base to a common receptacle, and containing each two seeds; the upper portion of each scale is winged. The seeds are ovate, blackish, one or both often abortive.

History.—This is one of the most magnificent and remarkable trees of the American forests, on account of its size, its striking foliage, its beautiful flowers, its useful wood, and its medicinal properties. It is found in rich soils from New England to Florida, attaining its greatest size in the Middle and South-western States, and its flowers appear in the latter part of May, or early in June. The wood is compact, of fine grain, light, and easily worked, and is much used for a variety of purposes; it has the property of resisting moist atmospheric influences, as well as the attacks of worms. The bark of the root or trunk is the officinal part. It is of a yellowish-white color when its epidermis is removed, the root-bark being the darkest. It is very light and brittle, of a peculiar rather disagreeable odor, and a bitter, pungent, aromatic taste. Age impairs its properties. Water or alcohol takes up its active properties, which are dissipated by long boiling. The bark should be collected during the winter. The virtues of the bark appear to reside in a volatile principle, which escapes during boiling, and to which the name of *liriodendrin* was given by its discoverer, the late Professor J. P. Emmet. It may be obtained by macerating the powdered bark in alcohol, boiling the tincture with magnesia till it assumes an olive-green color, then filtering, concentrating by distillation till the liquid becomes turbid, and finally precipitating the *liriodendrin* by the addition of cold water. In the pure state it is white, solid, crystallizable, brittle, insoluble in water, soluble in alcohol or ether, fusible at 180° , volatilizable and partly decomposed at 270° , slightly aromatic, with a warm, bitter, pungent taste. It is precipitated from infusion or decoction by alkalies, and from its alcoholic solution by water; and does not unite with acids nor alkalies.

Properties and Uses.—Tulip tree bark is an aromatic, stimulant tonic, and has proved beneficial in intermittents, chronic rheumatism, chronic diseases of the stomach and bowels, worms, and hysteria. In hysteria, combined with a small quantity of Laudanum, it is said to be certain, speedy, and effectual, and also to abate the hectic fever, night-sweats, and colliquative diarrhea of phthisis. The warm infusion is diaphoretic, and under certain states of the system has proved diuretic. Dose of the powdered bark, from a scruple to two drachms; of the saturated tincture, which is the best form of administration, one fluidrachm; of the infusion, from one to two fluidounces; of *liriodendrin*, from five to ten grains.

Off. Prep.—Decoctum *Liriodendroni*; Vinum *Hydrastii Compositum*.

LOBELIA INFLATA.

Lobelia.

Nat. Ord.—Lobeliaceæ. Sex. Syst.—Pentandria Monogynia.

THE LEAVES AND SEEDS.

Description.—This plant, generally known as *Wild* or *Indian Tobacco*, is an annual or biennial indigenous plant, more commonly the latter, with a fibrous, yellowish-white *root*, and an erect, angular, very pubescent or hairy *stem*, from six inches to two feet in height, and much branched toward the top. The *leaves* are scattered, alternate, sessile, ovate or oblong, unequally serrate, and hairy. The *flowers* are numerous, small, in leafy terminal racemes, and supported on short peduncles, each arising from the axil of a small bract. The *calyx* is five-toothed, the segments being linear, pointed, and as long as the corolla. The *corolla* is of a pale-blue color, monopetalous, but cleft on its upper side nearly to its base, bilabiate, with the upper lip divided into two lanceolate segments, and the lower into three oval ones. *Anthers* united into an oblong, curved body, purple; *filaments* white. *Style* filiform; *stigma* curved, two-lobed, and inclosed by the anthers. *Capsule* two-celled, ovoid, inflated, striated, ten-angled, and crowned with the persistent calyx. *Seeds* numerous, small, oblong, brown.

History.—This is a very common weed, growing in fields and by the roadsides throughout the United States, and flowering from July to September, or until the occurrence of frost. The whole plant possesses medicinal activity, but the leaves and seeds are more usually employed. The root is said to be the most active part of the plant. The proper time for gathering the plant is in August or September, when the capsules are numerous. It should be dried in the shade with care, when it may be kept whole, or in the state of powder. When dried it has a faint, irritating, rather unpleasant odor, and a strong, acrid, nauseous taste, very much resembling tobacco, producing a burning acrid impression upon the tongue and fauces, attended with nausea and a flow of saliva. The powdered leaves are of a greenish color—the seeds in powder, brownish. It yields its properties to water by infusion, alcohol, ether, or vinegar. Heat dissipates its active principles, hence it should never be boiled. It contains an odorous volatile principle, *lobelic acid*, gum, resin, chlorophylle, fixed oil, lignin, salts of lime and potassa, oxide of iron, and a peculiar alkaline principle, named *Lobelina*, of which the seeds contain double the amount found in any other part of the plant.

The *fixed oil* of lobelia may be obtained by bruising the seed between heated rollers, and pressing while hot in a strong linen cloth, between proper iron plates. Its consistence is nearly like that of linseed oil, and possesses the drying qualities common to the fixed oils. It possesses all the medical properties of the seed.

Lobelina may be obtained by bruising one pound of lobelia seed in a mortar, and then adding eight pints of alcohol, and one pint of acetic acid; digest with the heat of the sun for several days, or until the seeds are deprived of their acrimony, and strain. Evaporate the tincture to two pints, and filter; then, by means of a water-bath, evaporate to an extract. This extract is then to be triturated with magnesia and water, and after repeated agitation for several hours, is strained through calico, and then filtered. This liquor, which holds the lobelina in solution is then shaken repeatedly with fresh portions of sulphuric ether, until the water settling below is deprived of its acrimony. The ethereal solution must now be drawn off with a syphon, or carefully decanted, and then left to evaporate spontaneously. The residue is impure lobelina, of a reddish-brown color, and a honey-like consistence. To obtain it pure, the residue is treated with water, to which a slight excess of sulphuric acid is added, and then boiled with animal charcoal, saturating with magnesia, filtering, agitating repeatedly with fresh portions of ether, till the aqueous portion is deprived of acrimony, then carefully decanting off the ethereal solution as before, or drawing it off with a syphon, and then evaporated again spontaneously. The lobelina thus obtained is a yellowish liquid, lighter than water, of an odor rather aromatic, and an extremely acrid and permanent taste. It is readily soluble in alcohol or ether, but less so in water. Ether will remove it from its aqueous solution, and upon evaporation the lobelina may be again obtained. Its reaction is decidedly alkaline, and with sulphuric, nitric and muriatic acids, it forms soluble and crystallizable salts, but not crystallizable with acetic, and probably tartaric and citric acids. It is instantly precipitated from its solution by tannic acid, with which it forms an insoluble compound. Unless combined with acids, it is decomposed by boiling. It possesses the active properties of the plant in a concentrated form. As an emetic, three to ten drops, sufficiently diluted with water, will generally operate. With vinegar, or citric acid and honey, it forms an oxymel which is very beneficial in bronchitis and cynanche trachealis. By some it is considered as the narcotic (?) principle of lobelia.

Lobelia was known to the Penobscot Indians, and was also extensively used by the people of New England in domestic practice, long before the time of Samuel Thomson, its assumed discoverer.

Properties and Uses.—Lobelia is emetic, nauseant, expectorant, relaxant, sedative, antispasmodic, and secondarily cathartic, diaphoretic, and astringent. There is much discordance of opinion among medical men as regards its narcotic properties, many denying that it holds any such influences whatever. When chewed, lobelia produces a disagreeable sense of burning and distension, which extends into the esophagus, terminating in nausea and vomiting, with oppressive prostration, relaxation of the muscular system, and a languid pulse. In doses of ten or twenty grains of the leaves or seeds, it is a prompt and efficient emetic,

and may be given in all cases where emesis is indicated; its action is somewhat modified by a combination with ipecacuanha and other vegetable emetics, and rendered safer and more effectual. In very small doses it excites diaphoresis, increases expectoration, diminishes cough, and counteracts spasmodic action. In all diseases of the respiratory organs, as croup, pneumonia, pertussis, catarrh, asthma, and those fits of dyspnoea resembling asthma, it will be found useful either as an emetic, or expectorant. As with ipecacuanha so with lobelia, it will be found very useful in all febrile diseases, especially during their earlier stages, as it relaxes the system, modifies arterial excitement, and produces diaphoresis, thus tending to equilibrate the circulation, and assisting the vital powers to eliminate morbid humors. As an expectorant it may be used in tincture combined with tincture of bloodroot, syrup of senega, oxymel of squill, wine of ipecacuanha, etc. In all cases where relaxation of the system is desired, either to subdue spasm, or otherwise, lobelia will be found a very valuable article—probably no remedy is more effectual. Spasmodic movement is incompatible with nervous and muscular relaxation, hence we find prompt relief in epilepsy, hysteria, cramps, tetanus, chorea, convulsions, etc., by the exhibition of lobelia in doses sufficient to excite nausea and relaxation. Rigidity of the os uteri has often been overcome by the employment of this drug internally, or as an enema. In strangulated hernia, and other intestinal obstructions, it has been found an excellent relaxant when used in injection; and on this account it is highly beneficial in fractures, dislocations, and tedious labors. It may be given internally, and applied in fomentation externally; the oil may be used externally likewise for the purpose of causing relaxation.

Externally, the infusion has been found useful in ophthalmic affections; and the tincture is a valuable local application to sprains, bruises, rheumatic pains, erysipelas, and erysipelatous inflammations, tetter, and other forms of cutaneous disease, as well as a remedy for the poison from ivy or dogwood. A poultice of powdered lobelia and slippery-elm bark, with a weak ley-water will be found valuable in erysipelatous diseases, bites and stings of poisonous insects, spasmodic affections of the limbs, pains, and to produce muscular relaxation.

The oil of lobelia, as prepared by W. S. Merrell, is valuable in tetanus and some other extreme cases, as it is easy to introduce enough upon the tongue to relax the whole system immediately. On account of its tendency to produce inflammation of the stomach, it should not be employed alone as a common emetic, but a few drops of it should be triturated with sugar, and diffused in chamomile, boneset, or other emetic infusion. One drop of the oil triturated with one scruple of sugar, and divided into from six to twelve doses, will be found highly useful as an expectorant, nauseant, sedative, and diaphoretic, when given every one or two hours, as may be required. As a local application, much benefit

may be derived from it, where a particular nerve is to be quieted, or a muscle to be relaxed. An excellent liniment may be made of a mixture of half an ounce each of oils of amber and sassafras, a drachm of oil of lobelia, and half a drachm of ethereal oil of capsicum. To be used in painful neuralgic and rheumatic affections. As an emetic, dose of the powder, from twenty to sixty grains; of the tincture, from two to four fluidrachms. As a nauseant and expectorant, from five to twenty grains. When lobelia does not act as an emetic, it is very apt to purge.

There are two other species of lobelia, the Blue lobelia, *Lobelia Syphilitica*, and the Red lobelia, *L. Cardinalis*. The first is diaphoretic, emetic and cathartic; also diuretic and antisymphilitic, and a strong infusion of it has cured gonorrhea. It has likewise been used in dropsy, diarrhea, and dysentery. The root is the part used; dose, from twenty to sixty grains of the powder. The *L. Cardinalis* is said to be anthelmintic, nervine, and antispasmodic. These two varieties are seldom, if ever, used in medicine.

Off. Prep.—Acetum Lobeliæ; Cataplasma Lobeliæ et Ulmus; Enema Lobeliæ Composita; Extractum Lobeliæ Fluidum; Extractum Lobeliæ Fluidum Compositum; Linimentum Stillingiæ Compositum; Lotio Lobeliæ Composita; Oleum Lobeliæ; Pilulæ Aloës Compositæ; Pulvis Lobeliæ Compositus; Tinctura Hydrastis Compositæ; Tinctura Lobeliæ; Tinctura Lobeliæ Composita; Tinctura Lobeliæ et Capsici; Tinctura Sanguinariæ Acetata; Tinctura Sanguinariæ Composita; Tinctura Viburni Composita.

LYCOPUS VIRGINICUS.

Bugleweed.

Nat. Ord.—Lamiacæ. *Sex. Syst.*—Diandria Monogynia.

THE HERB.

Description.—This plant, also known as *Paul's Betony*, and *Water Horehound*, is indigenous, with a perennial, creeping fibrous root, from which arises an erect, herbaceous, furrowed, somewhat pubescent, obtusely quadrangular stem, nearly simple, and from one to two feet in height. The leaves are opposite, sessile, broad-lanceolate, attenuated and entire at both extremities, remotely serrate in the middle, somewhat rough, purplish, and beset with glandular dots on their under surface. The flowers are minute, sessile, in axillary whorls, with two subulate bracts at the base of each flower. The calyx is tubular, four-cleft, shorter than the seeds, persistent; segments ovate-lanceolate and acute. Corolla white, tubular, with four small round lobes, twice as long as the calyx, the emarginate segment broader than the others. Stamens two, as long as the corolla, inserted on the tube near the base of the upper segment. Anthers erect, two-lobed, pale-purple. The ovary is superior,

quadrangular, somewhat furrowed, with a filiform style, somewhat exserted, and terminated by a two-cleft stigma, the lobes of which are acute. *Seeds* four, longer than the calyx, obovate, compressed, and crenate at the top.

History.—Bugleweed is found growing throughout the greater part of the United States, in moist and shady situations, flowering in July and August. It has a peculiar, balsamic, terebinthinate odor, and a disagreeable, slightly bitter taste. It imparts its properties to boiling water in infusion. The whole herb is officinal. It has not been analyzed, but, probably, its virtues depend upon a volatile oil and tannic acid.

Properties and Uses.—The exact medicinal virtues of this plant are not fully understood. It appears to possess sedative, tonic, astringent, and narcotic properties, and has been successfully used in incipient phthisis, hemoptysis, and other hemorrhages; it allays irritation, diminishes the frequency of the pulse, and lessens cough. It acts somewhat like digitalis, in abating the velocity of the pulse, but is devoid of the dangerous effects resulting from the use of that drug. It is peculiar to Eclectics in the treatment of diabetes, having cured when all other means were useless; and has been beneficial in chronic diarrhea and dysentery, inflammatory diseases of drunkards, diseases of the heart, and intermittents. Dose of the powder, from one to two drachms; of the infusion, from two to four fluidounces.

The *Lycopus Europæus*, a European species, but naturalized in this country, has long been employed as a febrifuge; and the most obstinate intermittents have been cured by two-drachm doses of the dried plant. It is frequently collected and sold for *L. Virginicus*, but may be distinguished by its *acutely* quadrangular stem, its narrow lanceolate leaves of which the lower are somewhat pinnatifid, its more crowded flowers, and the acute segments of its calyx, armed with short spines.

Off. Prep.—Infusum *Lycopus*.

LYTHRUM SALICARIA.

Loosestrife.

Nat. Ord.—Lythraceæ. *Sex. Syst.*—Dodecandria Monogynia.

THE HERB.

Description.—This plant, also known by the name of *Purple-willow-herb*, is an elegant perennial, with a woody root, sending up several erect, leafy, slender, reddish stems, three or four feet high, downy, herbaceous, quadrangular, or even hexangular near the root. The leaves are mostly opposite, occasionally in whorls of three or four, in which cases the number of angles in the stem is likewise increased; they are also nearly sessile, lanceolate, acute, entire, from

three to six inches in length, and about one-fourth as wide, the upper ones diminished to bracts, cordate at the base, and downy on the under surface, and at the margin. The *flowers* are large, numerous, nearly sessile, inodorous, purple, axillary, crowded and whorled in a terminal, interrupted wand-like spike, six in each whorl. The *calyx* is inferior, cylindrical, striated, downy or hairy, with twelve marginal teeth, six of which are long, subulate, erect, and reddish; the others minute, ovate, concave, and inflected. The *petals* are six, elliptic-oblong, equal, waved. *Stamens* twelve, filiform, the six alternate ones shorter, bearing red, roundish anthers, with green or yellow pollen. The *ovary* is ovate-oblong, with a simple style and capitate stigma. The *capsule* is small, elliptical, two-celled, many-seeded, and inclosed in the tube of the calyx.

History.—This plant is found in various parts of the world, being an inhabitant of Europe, Asia, North America, and New Holland, growing in wet situations, and in this country bearing purple flowers in July and August. It is inodorous, but has a herbaceous, mucilaginous, somewhat astringent taste. It yields its properties to water. It has not been analyzed, but probably contains tannin and much mucilage. It renders boiling water very mucilaginous, and its decoction is blackened by sulphate of iron.

Properties and Uses.—Demulcent and astringent. Very useful in diarrhea, dysentery, and other affections of the bowels, where this class of remedies is indicated; used freely in decoction. Externally, it is very beneficial as a local application in ophthalmia, leucorrhea, gleet, ulcers, and some forms of cutaneous disease; used either as a wash, or in form of poultice. Dose of the powder, one drachm, two or three times a day; of the decoction, one or two fluidounces. The *Decodon*, or *L. Verticillatum*, or Swamp Willow-herb, bearing purple flowers, possesses similar properties to the above; it is said to cause abortion in mares and cows browsing it in winter, and may, perhaps, exert a medicinal influence on the female uterus. It grows in swamps throughout the United States and Canada, has a *stem* woody at the base, often prostrate, and rooting at the summit, three to eight feet long, or when erect from two to three feet in height, and from four to six-angled. The *leaves* are opposite, or in whorls of three, lanceolate, on short petioles, acute at base, from three to five inches long, gradually acuminate and acute at apex. The *flowers* are large, purple, in axillary subsessile umbels of three or more, apparently whorled, constituting a long, leafy, terminal and showy panicle. *Calyx* short, broadly campanulate, with five erect teeth, and five elongated, spreading, horn-like processes. *Petals* five or six. *Stamens* ten, alternate ones very long; *style* filiform; *capsule* globose, included, three-celled, many seeded.

Off. Prep.—Decoctum Lythri.

MAGNESIA. (*Magnesia Usta.*)

Magnesia.

Preparation.—Magnesia, or *Calcined magnesia*, as it is more usually termed, is obtained by placing carbonate of magnesia in an earthen vessel, and exposing it to a red-heat for two hours, or until all the carbonic acid is expelled, by which process the earth is obtained pure. A very intense heat is not required for the calcination, but merely sufficient to expel the water and carbonic acid; if a higher heat is kept up, the magnesia obtained will be hard, dense, less readily soluble in acids, and less beneficial as a medicine. The expulsion of the carbonic acid may be known by mixing a little of the magnesia with water, when on the addition of muriatic acid, no effervescence ensues.

History.—Magnesia is a pure white powder, of various degrees of density, obscurely alkaline, inodorous, and of an earthy taste; it attracts from twelve to twenty per cent. of moisture from the air, passing from the caustic to the slaked condition, but it does not absorb carbonic acid in a corresponding degree. Water sprinkled on it is absorbed to the extent of about 18 per cent., but without heat being evolved, and when thrown into water, it crackles slightly. Its specific gravity is about 2.3. Trituration greatly increases its specific gravity, so that a bottle which would only contain one ounce of it when not triturated, will, by this process, readily hold four ounces, or four times the quantity. The density of the magnesia is increased by employing a high temperature during calcination. It is soluble in 5142 parts of water at 60°, in 36,000 parts of boiling water. It unites with acids, occasioning much heat, and forms salts, some of which are soluble; the nitrate and muriate of magnesia are very deliquescent, and soluble in alcohol. It is precipitated from its saline solutions, in the state of a hydrate, by the pure alkalies, and in the state of a carbonate by the carbonates of soda and potassa; the bicarbonates of alkalies, and ordinary carbonate of ammonia cause no precipitate. Magnesia is a metallic oxide, consisting of one equivalent of magnesium 12, and one of oxygen 8=20, (Mg O.)

Henry's magnesia is usually considered the best; its method of preparation is not known; some suppose its softness, density, and ready miscibility with water, to be owing to its being prepared by precipitation of a solution of sulphate of magnesia by caustic potassa; others suppose the precipitation to be accomplished with carbonate of soda; and others again to the employment of an intense heat. If equivalent quantities of crystallized sulphate of magnesia, and crystallized carbonate of soda be boiled together in water, the mixture evaporated to dryness, the residual salts calcined, and the sulphate of soda dissolved out by water, the magnesia obtained will be denser. Husband's magnesia stands next to Henry's, and Ellis's last.

Magnesia is subject to adulteration with lime, alumina, silica, and,

from careless calcination or preservation, carbonate of magnesia. If carbonate of magnesia be present, the addition of muriatic acid will cause effervescence; silica may be detected by the same acid, which slowly dissolves the magnesia but does not touch the silica. Alumina may be detected by dissolving fifty grains of magnesia in a fluidounce of muriatic acid,—if alumina be present, ammonia added in excess will cause a precipitate of the adulteration. A neutral solution of pure magnesia in a dilute acid, is not disturbed by the addition of oxalate of ammonia, or bicarbonate of potassa; but if lime be present, both cause precipitates; the first of oxalate of lime, the second of carbonate. Adherent sulphate of magnesia is indicated in the muriatic solution of magnesia, by the chloride of barium, which precipitates a white sulphate of baryta.

Properties and Uses.—Magnesia is antacid, antilithic, and laxative. It is useful in dyspepsia with acidity, and is preferable to the carbonate, as it can be given in a much smaller dose, and does not occasion flatulence; its laxative qualities likewise give it some advantage over alkaline remedies. In all cases attended with acidity and constipation it will be found useful. It acts as an antilithic, first by correcting gastric acidity, and secondly by forming with free lithic acid, or lithate of ammonia, the more soluble lithate of magnesia. It is on this account beneficial in gout, and rheumatic gout, frequently giving material relief. It is apt to lodge in the bowels, if no acid be present, hence, in this case, it should be followed by a draught or two of lemonade. It is often united with rhubarb as a laxative and antacid. Freshly precipitated hydrate of magnesia, is a good antidote to arsenious acid, though inferior to the hydrated peroxide of iron. The following is recommended in cases of poisoning, in which the nature of the poison is unknown: after freely evacuating the stomach by emetics, give the following mixture in a sufficient quantity of water—Calcined magnesia, pulverized charcoal, and sesquioxide of iron, of each, equal parts, mixed together. It is perfectly innocuous, and as its ingredients are antidotes to the most active and commonest poisons, it is very likely to be efficacious. Dose, as a laxative from half a drachm to a drachm; as an antacid, or antilithic, from ten to thirty grains twice a day.

MAGNESIÆ CARBONAS.

Carbonate of Magnesia.

Preparation.—Carbonate of Magnesia rarely occurs as a native mineral, but is usually prepared on a large scale, by decomposing the sulphate of magnesia with carbonate of soda. Dissolve four pounds nine ounces of carbonate of soda, and four pounds of sulphate of magnesia, separately, in two gallons (*Imperial measure*) of distilled water; mix the solutions, then boil for two hours, constantly stirring it with a

spatula, and adding a little distilled water now and then, so as nearly to preserve the measure; then pour off the liquor, collect the precipitate, wash it thoroughly with boiling distilled water, and dry it.

Some of the best manufacturers are said to prepare it according to the following method; a solution of one hundred and twenty-five parts of crystallized carbonate of soda is gradually added to a saturated solution of one hundred parts of sulphate of magnesia, constantly stirring the solutions. The mixture is then heated to ebullition, in order to complete the precipitation of the magnesia, which is subsequently washed with tepid, and finally with cold water, until the washings no longer give a precipitate with the salts of baryta. When it is sufficiently washed, the carbonate is allowed to drain for one or two days on large linen filters, and is then placed in wooden molds with a porous bottom of brick or gypsum, and subjected to pressure in order to give it the square and compact form into which it is usually wrought.

History.—Carbonate of Magnesia is made, in this country, from the bittren of salt works, which consists principally of sulphate of magnesia, and chloride of magnesium. But the greater part of that used is imported from Scotland, from which place it comes to us in cases of one hundred and twenty pounds each. Official Carbonate of magnesia is a pure white powder, loose, and granular if dense, but somewhat coherent, like starch, if light,—inodorous, nearly tasteless, smooth to the touch, permanent in the air, and feebly alkaline in its action on vegetable colors. It is soluble in 2493 parts of cold, and 9000 parts of hot water; it is more soluble in cold water if it be charged with carbonic acid, forty-eight parts of water being then sufficient. It is soluble in diluted nitric, muriatic, sulphuric, or carbonic acids, and effervescence takes place. It is decomposed by strong heat, all the acids, potassa, soda, lime, baryta, strontia, the sulphate, phosphate, nitrate, or muriate of alumina, and by acidulous or metallic salts.

There are two kinds of this salt in commerce, the *light* and the *heavy*. Its density is said to depend upon the strength of the solutions from which it is first precipitated, and its fineness and softness to the touch, upon the use of carbonate of soda in its preparation. The light carbonate is the kind manufactured in Scotland. Carbonate of magnesia varies in its composition with the mode of preparation. Berzelius, whose doctrine is most current, supposes it to be a compound of three equivalents of the hydrated neutral carbonate, with one equivalent of hydrated magnesia. According to Phillips, four equivalents of the carbonate are combined with one of the bi-hydrate, and four of water.

The impurities of carbonate of magnesia, are similar to those of magnesia, and usually occur from carelessness in the process of manufacturing. If water in which carbonate of magnesia is boiled changes turmeric paper, it contains an alkaline carbonate. If chloride of barium

causes a precipitate in the water, it indicates the presence of a sulphate, or carbonate, or both. If nitrate of silver produces a precipitate, a chloride is present, probably of sodium. Alumina is separated from the muriatic acid solution by an excess of ammonia—the solution to be made in an excess of the acid. And after the alumina has been thrown down, if lime be present, the addition of oxalate of ammonia will cause a precipitate of oxalate of lime.

Properties and Uses.—Carbonate of Magnesia is antacid, antilithic, and by combining with acid in the stomach, it becomes generally cathartic; but produces no purgative effect, if it undergoes no change in the alimentary canal. Hence, it is always useful to give it in combination with lemonade or lemon juice. Useful in cases of acid stomach, gout, and where the urine contains an excess of uric acid; but from its liability to produce flatulence, in consequence of the extrication of its carbonic acid in the stomach and bowels, it is inferior to the calcined magnesia. Dose, as an antacid and antilithic, one or two scruples; as a cathartic, one or two drachms in water or milk. It is a useful agent for diffusing camphor and volatile oils through water in preparing several of the medicated waters.

Off. Prep.—Liquor Magnesiae Citratis.

MAGNESIÆ SULPHAS.

Sulphate of Magnesia. (*Epsom-Salts.*)

Preparation.—Sulphate of Magnesia, commonly known as Epsom-Salts, is one of the constituents of sea water, and of some saline springs. For its artificial manufacture, several processes are followed, the most important of which are as follows:—When prepared from bittern water, or the residual brine after crystallizing salt from sea water, it is accomplished by simple evaporation and crystallization. A little sulphuric acid is added to the bittern in order to convert the chloride of magnesium, which forms part of its saline ingredients, into the sulphate. It is then carefully evaporated, and the sulphate of magnesia crystallizes first, leaving behind the chlorides of magnesium and calcium. It is then collected, and any impurities it may contain removed by washing the crystals in water, or by chemically precipitating the impurities, filtering, and evaporating. However, the sulphate of magnesia obtained by this process is very apt to be impure and deliquescent.

It is also prepared from dolomite, a magnesian limestone, composed of carbonate of lime and carbonate of magnesia; the carbonates may be converted into sulphates, and the latter separated by means of the inferior solubility of the sulphate of lime. Or the dolomite may be calcined, thereby driving off the carbonic acid, and converting the remaining earths into hydrates; then muriatic acid is added in such quantity as to

unite with the caustic lime only, and the chloride of calcium being removed by solution in water the magnesia is converted into the sulphate by means of sulphuric acid. It is likewise prepared from *magnesite*, a siliceous hydrate of magnesia, which is found in veins in the serpentine and other magnesian rocks so common in the neighborhood of Baltimore and southern Pennsylvania. This mineral is finely powdered, and the powder saturated with sulphuric acid. The whole mass is then dried and calcined at a red-heat, for the purpose of changing any existing sulphate of iron into red oxide. It is then dissolved in water, and sulphuret of lime added to separate any remaining portion of iron. The salt is crystallized and dissolved a third time in order to purify it. In this manner sulphate of magnesia is extensively prepared at Baltimore, and is usually very pure and clean. Sulphate of magnesia also occurs as a native production, being found abundantly in many of the great caverns of the western states. It is found in long, slender, prismatic crystals; as an efflorescence on certain rocks and soils, or it occurs in masses of six, eight, or ten pounds.

History.—Sulphate of Magnesia was discovered in 1694 by Grew, who prepared it from the saline waters of Epsom in England, from whence it has derived its familiar name, *Epsom-Salts*; at present it is usually met with in small acicular crystals, transparent and colorless, inodorous, of a cooling, saline, bitter, disagreeable taste, and slightly efflorescent in dry air. When slowly crystallized it forms large rhombic or quadrangular prisms, often truncated on the obtuse edges, and terminated by two or four converging planes, somewhat like the crystals of sulphate of Zinc, and sulphate of Soda. A moderate heat causes it to fuse in its water of crystallization; a higher temperature renders it anhydrous; and at a full red-heat the anhydrous salt melts into an enamel. It is insoluble in alcohol, soluble in its own weight of water at 60°, and in three-fourths of its weight at 212°. It is decomposed by potassa, soda, and their carbonates; by lime, baryta, strontia, and their soluble salts. Ammonia partially decomposes it, forming with the remaining salt a double sulphate. The bicarbonates of potassa and soda, decompose it by the aid of heat. It consists of one equivalent of acid 40, one of base 20, and seven of water 63=123, its combining number. ($\text{Mg O} + \text{SO}_3 + 7 \text{ Aq.}$)

This salt is liable to various impurities, but as now prepared is generally quite free from them. Iron, and chloride of magnesium are, probably, the most common impurities at present met with. Iron may be detected by ferrocyanuret of potassium, and the chloride of magnesium by rendering the salt moist. If sulphuric acid be added to the sulphate, and muriatic acid gas is not evolved, the absence of all chlorides is indicated. To detect the presence of sulphate of soda, ten grains of the salt are to be dissolved in a fluidounce of water, and treated with a solution of sesquicarbonate of ammonia; 280 minims of a solution of one

part of phosphate of soda in twenty parts of water are then added, which precipitates 97 per cent. of the magnesia in a pure sulphate, leaving a little magnesia in the solution. Filter the solution, and add to it more of the phosphate of soda solution, if no more magnesia is thrown down, the salt must contain something else than sulphate of magnesia.

Properties and Uses.—Refrigerant, cathartic and diuretic. Chiefly used in febrile and inflammatory affections, or in cases where a refrigerant, mild laxative effect is desired. It may be dissolved in eight times its quantity of water. The addition of four or five drops of sulphuric acid to the dose covers the bitter taste of the salt, causes it to sit easier on the stomach, counteracts its refrigerant effects, does not impair its energy, completely removes its tendency to gripe or irritate the rectum, and prevents it from interfering with the appetite or digestion. M. Combes states that the bitterness of this salt may be removed, by the following means: Take of Sulphate of Magnesia, one ounce, powder of roasted coffee, two and a half drachms, water about sixteen ounces. Place in a vessel (not a tin one), and boil for two minutes, remove from the fire, and let the mixture infuse for some minutes, so as to allow time for the development of the aroma; then strain and sweeten to the taste. By this process the salt is not decomposed. Should it be required to increase the amount of the sulphate without augmenting the proportion of coffee, two or three grains of tannic acid should be added to the boiling decoction. Dose of the powder, from two drachms to two ounces. Less used than formerly.

MAGNOLIA GLAUCA.

Magnolia.

Nat. Ord.—Magnoliaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE BARK.

Description.—This tree is known by several names, as *White bay*, *Beaver-tree*, *Sweet Magnolia*, *Swamp Sassafras*, etc. In the Northern States it is often nothing more than a shrub, from four to ten feet high; in the south it often attains the height of forty feet. Its average height is about twenty-five feet. The trunk is covered with a smooth grayish bark, and that of the young twigs is a bright, smooth green, scarred with rings at the insertion of the leaves by the fall of the deciduous stipules; the branches are crooked and much divaricated. The *leaves* are alternate, petiolate, oval, obtuse, entire, coriaceous, smooth, thick, opaque, yellowish-green on their upper surface, and with the exception of the midrib, of a beautiful pale glaucous color beneath; when young they are covered with a silken pubescence. The *flowers* are large, solitary, terminal, cream-colored, of a grateful odor, and stand on a short incrassated peduncle. The *calyx* is composed of three, spathulate, obtuse, concave sepals; the *corolla* consists of from

eight to fourteen, obovate, obtuse and concave petals, which are contracted at their base. The *stamens* are very numerous, and are inserted in common with the petals on the sides of a conical receptacle; *filaments* very short; *anthers* linear, mucronated, two-celled, opening inwardly. *Ovaries* collected into a cone, each divided by a furrow, and tipped with a brownish, linear, recurved style. *Fruit* a small, squarrose, fleshy cone, about an inch in length, of a green color tinged with red. These cones consist of numerous imbricated cells, each containing a bright red seed, and open longitudinally at the back for the escape of the seed. The *seeds* are obovate, and on the opening of the capsule at maturity, are connected to the cone by a funiculus, or white slender thread formed of spiral vessels, which suspends them for some time after they have fallen out. The *M. Glauca* is found growing in swamps and morasses along the seaboard, from Massachusetts to the Gulf of Mexico, and is seldom met with at any great distance from the seaboard. It flowers in May, June, or July according to the latitude. At the south it is known as *White bay*, or *Sweet bay*. The fragrance of its flowers is usually agreeable, but to some persons it is not only unpleasant, but absolutely deleterious, causing oppressed breathing and faintness.

MAGNOLIA ACUMINATA, or *Cucumber Tree*, is much larger than the preceding, often growing to the height of sixty or eighty feet, with a diameter of from four to six feet. The *leaves* are oval, acuminate, pubescent beneath, five or six inches in length by three or four in breadth. The *flowers* are five or six inches in diameter, bluish, sometimes yellowish-white, slightly odorous, with from six to nine obovate, rather obtuse petals. The cones are about three inches long, cylindric, bearing some resemblance to a small cucumber. This tree grows near the Falls of Niagara, and in the mountainous regions in the interior of the country from New York to Georgia; it is more abundant in the Southern States. Its flowers appear in May and June.

MAGNOLIA TRIPETALA, or *Umbrella Tree*, the *M. Umbrella* of *Lamark*, is a small tree not exceeding thirty feet in height, and almost always having an inclined trunk. Its *leaves* are from sixteen to twenty inches long, by six or eight in width, thin, obovate, somewhat wedge-shaped, entire, acute at both extremities, silky when young, and often appearing whorled at the ends of the branches in the form of an umbrella, displaying a surface thirty inches or more in diameter. The *flowers* are terminal, white, seven or eight inches in diameter, with from five to twelve, narrow lanceolate, acute petals, of which the three outer are reflexed. The *fruit* is conical, rose-colored, and from four to five inches in length. This tree is found growing in shady situations, in strong, deep, fertile soil, in the same range of country as the *M. Acuminata*, being, however, more generally confined to the lower grounds. It also flowers in May and June.

History.—All the species of *Magnolia* are possessed of similar medicinal virtues, which are found in the bark and fruit. The bark only is officinal, and that of the root is considered the most efficient, though probably without much reason. It has an aromatic odor, and a spicy, bitter, pungent taste, without any astringency. When dried, or by long keeping, its volatile aromatic principle is much diminished, but without any loss of its bitterness. It has not been analyzed but probably contains volatile oil, resin, and *magnolins*. Water or alcohol extracts its virtues.

Properties and Uses.—*Magnolia* Bark is an aromatic tonic bitter of considerable power, and appears likewise to possess antiperiodic properties. Intermittent fevers have been cured by it after cinchona had failed. It is not so apt to disagree with the stomach and bowels, nor to induce fullness of the head as the Peruvian bark, and can be continued a longer time with more safety in all respects. Its curative agency is said to be favored by the diaphoretic action which generally follows its administration. In dyspepsia, with loss of tone in the stomach, it is very useful as a tonic, and has also proved highly beneficial in the treatment of remittents having a typhoid character. A warm infusion acts as a gentle laxative and sudorific; a cold one as a tonic and antiperiodic, as does also the tincture and powder. The powder is considered the preferable form of administration. The bark of the *M. Tripetala*, chewed as a substitute for tobacco, has cured an inveterate tobacco chewer of the filthy habit, and deserves a further trial among those who wish to break up the pernicious practice. The bark in powder may be administered in half drachm or drachm doses, to be repeated five or six times a day; the infusion may be taken in wineglassful doses, repeated five or six times a day. It is used in the above forms of disease, as well as in chronic rheumatism. The tincture, made by adding an ounce of the powder to a pint of brandy, and allowing it to macerate for ten or twelve days, may be given in tablespoon doses three times a day, for the same purposes. A tincture made by adding two ounces of the cones to a pint of brandy, has long been used as a domestic remedy for dyspepsia and chronic rheumatism; it is given three or four times a day in doses of from one to four fluidrachms. *Magnolia* is contra-indicated whenever inflammatory symptoms are present.

MALVA SYLVESTRIS.

Common Mallow.

Nat. Ord.—Malvaceæ. *Sex. Syst.*—Monadelphia Polyandria.

THE HERB.

Description.—This is a perennial herbaceous plant, sometimes called *High-mallow*; it has a tapering, branching, whitish root, and a round, hairy, branching, usually erect *stem*, from one to three feet in height.

The *leaves* are alternate, petiolate, cordate, deep-green, soft and downy, serrated, plaited, with seven acute lobes; the uppermost with fewer, but deeper, and more acute lobes, than the lower ones. The *flowers* are large, numerous, of a shining purple, veiny, on simple, aggregate, hairy axillary stalks. The *calyx* is five-cleft. *Petals* five, inversely cordate, and three times as long as the calyx. *Stamens*, indefinite, monadelphous. *Pollen* large, whitish. *Ripe carpels* reticulated at the back.

MALVA ROTUNDIFOLIA, or *Low-mallow*, called by children who are fond of eating the fruit, *cheeses*, has a fusiform root and prostrate *stem*, with *leaves* of a fine, delicate texture, roundish, cordate, or somewhat uniform, crenate, obtusely five or seven-lobed, and on long hairy petioles. The *flowers* are pale-pink, with deeply-notched petals, and stand on aggregate, axillary peduncles. The *fruit* is depressed-globose, and composed of the numerous carpels arranged circularly.

History.—The *M. Sylvestris* is a native of Europe, and is naturalized in this country, growing abundantly in fields, roadsides, and waste places, and flowering from May to October. The whole plant, especially the root, abounds in mucilage. The *M. Rotundifolia*, a very common, troublesome plant growing around dwellings and in cultivated grounds, together with other species of this genus, possesses similar properties, and may be substituted for each other. The herb and flowers are inodorous, with a weak, herbaceous, mucilaginous taste. Water extracts their mucilage, and the solution is precipitated by acetate of lead. The root and seeds may be also used, as they contain much mucilage. An infusion or tincture of the flowers is blue, and is turned red by acids, and green by alkalies, and may hence be used as tests for these articles.

Properties and Uses. — Emollient and demulcent. Infusion and decoction used in catarrhal, dysenteric and nephritic complaints. Also used as an emollient injection, and the herb in the form of poultice to external inflammations. They may be employed in all cases where mucilaginous liquids are required.

MARANTA ARUNDINACEA.

Arrowroot Plant.

Nat. Ord.—Marantaceæ. *Sex. Syst.*—Monandria Monogynia.

THE FECULA OF THE RHIZOMA, ARROWROOT.

Description.—The root or rhizoma of this plant is perennial, tuberous, fleshy, horizontal, nearly cylindrical, scaly, from six inches to twelve, or more, in length, and furnished with numerous long white fibers. It sends forth several tuberous, jointed, curved, white, scaly stoles, the points of which sometimes rise above the ground, and become new plants. The *stems* are several, annual, slender, much branched, finely hairy, jointed, leafy, and about two or three feet in height. The *leaves*

are alternate, with long, leafy, hairy sheaths, ovate, lanceolate, slightly hairy underneath, pale-green on both sides, and about four inches long. The *flowers* are white, and disposed in a long, loose, spreading, terminal panicle, with long linear sheathing bracts at the ramifications. *Calyx* green, smooth, and consists of three small lanceolate leaves. *Corolla* white, small, monopetalous, with a tube longer than the calyx, and a double border, of which the three outermost segments are smallest, and the two inner obovate, and slightly emarginate. *Ovary* three-celled, hairy. *Fruit* nearly globular, with three obsolete angles, the size of a small currant.

History.—This plant is a native of the West Indies, from which it has been introduced and cultivated in the East Indies, in Sierra Leone, and in our Southern States. The plant is readily propagated by cuttings of the root. Arrowroot is obtained from the various portions of the root, which are dug up when a year old, washed, beaten into a pulp, and stirred in cold water; the fibers are removed by the hand, and the milky liquor, which holds the starch suspended, is passed through a fine sieve, the starch allowed to subside, and then after washing it with a fresh portion of water, it is dried without heat, or in the sun. This constitutes West Indian arrowroot, of which the finest comes from the Bermudas. Arrowroot is obtained likewise from other plants, as the *M. Allouya*, and *M. Nobilis* of the West Indies; the *M. Indica*, and the *Curcuma Angustifolia* of the East Indies. West Indian arrowroot is in the form of a light white powder, or of small, irregular, friable grains varying in size from a millet seed to a pea. It is inodorous, nearly tasteless, has a firm feel when pressed between the fingers, and when rubbed produces a faint crackling sound. If musty, it should be rejected. Musty arrowroot, having been thoroughly washed with two successive portions of cold water, and then dried upon frames of muslin in a warm place, has been rendered quite sweet. Examined by the microscope, arrowroot is found to consist of minute pearly globules or granules, which are rarely spherical or ovate, generally elliptical, sometimes of the form of a levigating muller, and of various sizes. A few attain the 750th of an inch, and many are only the 2000th of an inch in their longest diameter; their breadth is generally two-thirds of their length. Arrowroot presents all the chemical relations of wheat and potato starch, though it makes a firmer jelly with the same quantity of boiling water, nine parts in this respect being equivalent to fourteen of common starch. According to Prout, anhydrous arrowroot is composed of 44.0 per cent. of carbon, 6.22 of hydrogen, and 49.78 of oxygen or $C_{12}H_{10}O_{10}$, corresponding with the elementary composition of amylin, one of the principles of wheat starch.

West Indian arrowroot is sometimes adulterated with wheat or potato starch, or with the East Indian variety of arrowroot. Muriatic acid has been proposed as a test of their presence. When potato or wheat starch

is rubbed with twice their weight of a mixture of equal parts of muriatic acid and water, a mucilage is quickly formed so thick and tenacious that the mortar in which the trituration is effected may be raised by the pestle ; with rice flour, or arrowroot, this result does not ensue short of 25 or 30 minutes. It is said that from four to six per cent. of the impurity may thus be detected. But the microscope affords the best means of determining these adulterations, by observing the form of their granules. Thus the *true arrowroot* granules are rarely oblong, somewhat ovate-oblong, or irregularly convex, with very fine rings, a circular hilum which cracks in a linear or stellate manner, and small mammillary processes occasionally projecting from them. (*See above for size, etc.*) The East India arrowroot granules are of unequal size, ovate or oblong-ovate, flattened, and often furnished with a very short neck or nipple-like projection; the rings are numerous, close, and very fine, and the hilum, which is situated at the narrow extremity, is circular, small, and indistinct. (*See description of Tapioca.*) The *Tacca Fecula* from the South Sea islands, consists of circular, mullen-shaped, or polyhedral granules, with few and not very distinct rings, and a small, circular hilum, which is cracked in a linear or stellate manner. *Florida arrowroot* consists of granules forming the half, the third, or the quarter of a solid sphere. The *potato-starch* granules are very unequal in size, ovate, or for the most part elliptical, and from the 7000th to the 300th of an inch in length. (*See Canna.*)

East Indian arrowroot, is chiefly prepared from a plant growing throughout India, and particularly on the Malabar coast, the *Curcuma Angustifolia*; it is prepared by a process similar to that followed in the West Indies. It is commonly white, sometimes pale-yellow, less crepitating between the fingers than the best West Indian kind, more frequently damaged by impurities, and composed of rather larger globules, unequal in size, egg-shaped, compressed, faintly rugous at their larger end, and with little processes attached to their sides. It is lighter than maranta arrowroot, does not so quickly make a jelly, and is of low value, being in demand only among starch-makers.

Properties and Uses.—Arrowroot is nutritive and demulcent. Used as an article of diet in certain chronic diseases, during convalescence from fevers, bowel complaints, diseases of the urinary organs, and for infants after weaning. It may be given in the form of jelly, variously seasoned with sugar, lemon juice, fruit jellies, essences or aromatics. *Potato starch* is sometimes substituted for it, but it is more apt to cause acidity. Arrowroot is superior to every other kind of farinaceous food, except tapioca and tous-les-mois. Its jelly has no peculiar taste, and is less liable to become acid in the stomach, and is generally preferred by young infants to all others, except tapioca. Tous-les-mois makes a stiffer jelly. A tablespoonful of arrowroot may be formed into a paste with a little cold water, and then enough boiling water gradually added

with brisk agitation to make a pint. It may be seasoned with any of the above-named articles if not contra-indicated. For children it is usually prepared with milk.

MARMOR ALBUM.

White Marble.

WHITE GRANULAR CARBONATE OF LIME.

History.—White Marble is known from most other minerals by its pure white color, its crystalline structure, and the effervescence it presents when touched with nitric or muriatic acids. It is tasteless, inodorous, brittle, pulverizable, and insoluble in water or alcohol. Its specific gravity varies from 2.7 to 2.8. When exposed to a full red-heat, it acquires an earthy appearance, loses about 44 per cent. of carbonic acid, and is converted into lime. It dissolves less rapidly in acetic acid than in nitric or muriatic; it also dissolves with effervescence in sulphuric acid, and forms an insoluble salt. When pure it consists of one equivalent of acid or 22.12 parts, and one of lime, or 28.5 parts ($\text{Ca O} + \text{CO}_2$.)

It is sometimes rendered impure by the presence of magnesia. To detect this, the marble must be dissolved in diluted muriatic acid, taking care that the marble neutralizes the muriatic acid, or else the magnesia will not be thrown down on account of the formation of muriate of ammonia. To this neutral muriatic solution add ammonia, and if magnesia be present, it will be precipitated. If strontia or baryta be an impurity, a solution of sulphate of lime will cause a precipitate.

Properties and Uses.—Marble is used for obtaining acid, as well as for making several officinal preparations. Common marble is sufficiently pure for the former purpose, but not for the latter. The *Dolomitic marbles* contain considerable proportions of magnesia, and are therefore unfit for pharmaceutic use. The finest and purest variety of marble is that of Carrara, sometimes called Statuary Marble.

Off. Prep.—Aqua Acidi Carbonici; Potassæ Bicarbonas; Sodæ Bicarbonas.

MARRUBIUM VULGARE.

Hoarhound.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE HERB.

Description.—Hoarhound has a perennial fibrous root, and numerous, annual bushy stems, which are erect, quadrangular, leafy, clothed with fine woolly pubescence, branching from the bottom, and from one to two feet in height. The leaves are roundish-ovate, crenate-dentate, wrinkled, veiny above, hoary on the under surface, one or two inches in diameter and supported in pairs upon strong footstalks; the upper ones nearly

sessile. The *flowers* are small, white, in sessile, axillary, hairy, and dense whorls. The *calyx* is tubular, five to ten-nerved, nearly equal, with five or ten recurved, acute, spiny teeth, the alternate ones shorter; orifice of the tube, hairy. The *corolla* is tubular, with a labiate margin, of which the upper lip is bifid, the under reflected and three-cleft, with the middle segment broad, and slightly scalloped. *Stamens* four, didynamous, included beneath the upper lip of the corolla; *anthers* with divaricating, somewhat confluent lobes, all nearly of the same form. *Style* with short obtuse lobes. *Achenia* obtuse. *Seeds* four, lying in the bottom of the calyx.

History.—This plant is a native of Europe, but has been naturalized in some parts of the United States. It grows on dry, sandy fields, waste grounds, road-sides, and banks of rubbish, especially in warm, dry situations, and flowers in July and August. The whole plant has a white, hoary appearance. The whole herb is officinal, it has a peculiar, rather agreeable, vinous, balsamic odor, and a very bitter, aromatic, somewhat acrid, and persistent taste. Its bitterness is extracted by alcohol or water. It contains resin, tannic acid, volatile oil, a peculiar crystallizable bitter principle, and lignin. The bitter principle is insoluble in water, soluble in ether, more so in hot than cold alcohol, is perfectly neutral, and melts like resin when heated.

Properties and Uses.—Hoarhound is a stimulant tonic, expectorant, and diuretic. It is used in the form of syrup, in coughs, colds, chronic catarrh, asthma, and all pulmonary affections. The warm infusion will produce diaphoresis, and sometimes diuresis, and has been used with benefit in jaundice, asthma, hoarseness, amenorrhœa, and hysteria; the cold infusion is an excellent tonic in some forms of dyspepsia, acts as a vermifuge, and will be found efficacious in checking mercurial ptyalism. In large doses it purges. It enters into the composition of several syrups and candies. Dose of the powder, one drachm; of the infusion, or syrup, from two to four fluidounces.

Off. Prep.—Infusum Marrubii; Syrupus Araliæ Compositus.

MARUTA COTULA. (*Anthemis Cotula*.)

Mayweed.

Nat. Ord.—Asteraceæ, (*Lindley*), or Compositæ, *Sub-tribe*, Anthemideæ.
Sex. Syst.—Syngenesia Superflua.

FLOWERS.

Description.—Maruta Cotula has an annual, crooked, tapering, fibrous root, with one or more stems, erect, branched, bushy, leafy, angular, furrowed, nearly smooth, solid, and rising from one to two feet high. *Branches* corymbose. *Leaves* alternate, sessile, bright-green, smooth, or slightly hairy, bipinnatifid and cut; the segments narrow, flat, a little

succulent, spreading and rather distant, not crowded or parallel, somewhat bristle-pointed. *Flower-heads* solitary, on terminal, striated, slightly downy peduncles. *Involucre* hemispherical, imbricated, hairy, rough; the scales linear, pale-green, scarious on the margin. *Florets of the disk*, bright-yellow, numerous; *those of the rays* white, ligulate. *Receptacle* conical, covered with short, bristly chaff. *Central florets* tubular, glandular, five-toothed, with five-stamina. *Ovary* obovate, with a filiform, bifid style. *Stigmas* two, reflexed. *Seeds* brown, obovate, quadrangular, ribbed.

History.—Mayweed is a native of Europe, and is extensively cultivated in this country, where it is known by several other names, as *Wild Chamomile*, *Dog-fennel*, etc. It may be found growing in all waste places, in hard, dry soils, especially along road-sides. Its flowers are white, and appear from June until September. Every part of the plant is acrid and fetid, and according to Linnæus is grateful to toads, drives away fleas, and is annoying to flies. The whole plant is officinal.

Properties and Uses.—Tonic, emetic, antispasmodic, emmenagogue and epispastic. The cold infusion or extract may be substituted, as a tonic and antispasmodic, in all cases, for the foreign article. The extract may be used in sick headache, and in convalescence from fevers. A warm infusion may be used as an emetic or diaphoretic. It has been efficient in amenorrhea. The fresh plant bruised and applied to the skin, will cause vesication, and the sores heal readily. A powerful epispastic is made by bruising the fresh leaves of *M. Cotula* and *Polygonum Punctatum*, equal parts, and moistening them with a small quantity of spirits of turpentine. Dose of the infusion, from one to four fluidounces, as often as required.

Off. Prep.—Infusum Anthemidis Cotulæ.

MEL.

Honey.

A LIQUID PREPARED BY APIS MELLIFICA.

History.—The *Apis Mellifica*, or honey bee, belongs to the order *Hymenoptera* of the class of insects. In the wild state it dwells in the hollows of trees in large communities, consisting of males, females, and neuters. The neuters only collect honey, they suck it from the nectaries of flowers by means of their proboscis, convey it into a proper receptacle, and discharge it into the cells of the honeycomb, somewhat altered in its sensible qualities. It is yet undetermined, however, whether honey is a secretion of the bee, or exists already-formed in the plant. The nectaries of flowers, it is well known, contain a saccharine substance, which is taken up by the insect, and the honey formed is also affected in its flavor and character by the nature of the plants which predominate

in the vicinity of the hive—yet some change is undoubtedly undergone in the organs of the bee, as there is an appreciable difference between the saccharine matter of the nectaries and honey. Honey of a superior quality is obtained by allowing it to drain from the comb; and if it be from a hive of young bees before they have swarmed, it is called *Virgin honey*. After the first honey is collected, an inferior quality is procured by submitting the comb to pressure, or by fusion in the vapor-bath. The greater proportion of the honey used in the maritime towns and cities of this country is imported from Cuba; though large quantities of it are collected at home.

At first honey is fluid, thick, viscid, colorless, or of the palest straw tint, of a peculiar fragrant odor, and of a corresponding, very sweet taste. On being kept it forms a crystalline deposit, and ultimately becomes concrete from the formation of numberless granular crystals. Its flavor varies according to the flowers from which it was collected, and its specific gravity is about 1.333. In a great measure it is soluble in water, and not so readily soluble in alcohol. Boiling alcohol dissolves it, and on cooling deposits crystals of grape sugar. It is said to contain crystallizable sugar analogous to that of grapes, and two other kinds of sugar, one of which is changed by acids, and has the property of turning the rays of polarized light to the right; and the other, not acted on by acids, and possessed of a strong left-handed rotating power. Of these two sugars, the first is not always present in honey, as it is supposed to be changed, in time, into granular sugar; it is more abundant in honey taken from the comb. The second is similar to that uncrystallizable sugar formed by the reaction of acids on cane sugar, being identical with it in composition, like it uncrystallizable, and very sensitive to the action of alkalis; but differs by the impossibility of converting it into granular sugar, and by having nearly twice the rotating power of common uncrystallizable sugar. Beside these saccharine principles, honey also contains an aromatic principle, an acid, wax, and a little mannite. Diluted with water honey undergoes the vinous fermentation, and if yeast be added it forms the alcoholic liquor called Mead; nitric acid converts it into oxalic acid. Inferior honey contains a large proportion of uncrystallizable sugar and vegetable acid. Honey is occasionally adulterated with starch, especially the inferior kinds, in order to give them a white appearance. This may be detected by diluting with water, which dissolves the honey and leaves the starch at the bottom of the vessel. The tincture of iodine will determine the nature of the deposit. Sometimes water is added to increase its bulk, which may be known by the great thinness of the honey, and its tardiness to crystallize. If not very pure, honey is apt to ferment in warm weather, acquiring a deeper color and a pungent taste.

Mel despumatum or clarified honey is generally obtained from the inferior qualities; the process of clarification is entirely unnecessary

with fine honey. It may be purified by melting the honey by means of a water-bath, the wax and other light impurities float to the surface, and may be skimmed off, while the heavier substances, if present, sink to the bottom, from which the honey may be decanted. The French clarify honey as follows: Take of honey 3000 parts, water 750 parts, powdered and washed carbonate of lime 96 parts. Mix them in a suitable vessel, and boil for three minutes, stirring constantly. Then add 96 parts of animal charcoal previously washed, heated to redness, powdered and sifted, and boil for a few minutes. Lastly, add the whites of two eggs beat up with 500 parts of water, and bring the liquid to the boiling point. Remove the vessel from the fire, and after the liquid has cooled for fifteen minutes, strain it through flannel, and repeat the straining till the liquid passes perfectly clear. Should it not have the proper consistence, it should be sufficiently concentrated by a quick boiling. The use of the carbonate of lime is to saturate any acid in the honey which might favor the formation of glucose, and thus increase the tendency to granulation.

Properties and Uses.—Honey is nutritious, antiseptic, diuretic, and demulcent. Used in urinary affections, and as an addition to gargles, lotions, injections, etc. It is said that the Indians make an infusion of the honey bee, and give a gill of it every half hour, in strangury, suppression of urine, etc.; and it is further added, that this infusion has the power of destroying the sexual propensity. A very excellent preparation for coughs, especially during febrile or inflammatory attacks, is composed of honey, olive oil, lemon juice, and sweet spirits of nitre, of each, one fluidounce; to be taken several times a day, in half fluidrachm or fluidrachm doses. A tincture of honey bees is made by collecting a quantity of the living insects in a vial, agitating them roughly so as to irritate them, and while in that condition they are to be covered with alcohol; in a few days it will be ready for use. In doses of five, ten, or fifteen drops, three or four times a day, this is highly recommended in many diseases of the bladder and kidneys, as well as in some uterine affections. Some practitioners assert that it will produce abortion in the pregnant female, if its use be too long continued, or when employed too freely.

Off. Prep.—*Pilulæ Ferri Carbonatis*; *Tinctura Opii Camphorata*; *Unguentum Plumbi Compositum*.

MELIA AZEDARACH.

Pride of China.

Nat. Ord.—Meliaceæ. *Sex. Syst.*—Decandria Monogynia.

THE BARK OF THE ROOT.

Description.—This is a beautiful tree, also known by the names *Bead-tree*, *Pride of India*, etc.; it attains the height of thirty or forty feet, with

a trunk fifteen or twenty inches in diameter, and spreading branches. The bark on the trunk and large branches is scabrous. The *roots* are horizontal, rather superficial, and extend to a considerable distance. The *leaves* are large, alternate, unequally bipinnate; the *leaflets* opposite, smooth, ovate, acute, denticulate, dark-green, with an odd one at the end. The *flowers* are fragrant, of a lilac-color, forming a terminal, drooping panicle, from the axils of the upper leaves. The *calyx* is very small, and is formed of five obtuse, slightly-pubescent sepals, united at base. The *petals* are five, pale-pink inside, deep lilac outside, much longer than the calyx, spreading, oboval, and obtuse. The *stamens* are united into a tube, which is rather shorter than the petals, dilated at base, of a dark-violet color, and ten-toothed; each tooth being bifid, it appears twenty-toothed, except on close inspection. The *anthers* are yellow, bilocular, alternate with the dentures of the tube, and attached to its inner surface. The *ovary* is globular, surmounted by a thick style, which is terminated by a small five-lobed stigma. The *fruit* is a fleshy berry or drupe, of an ovoid shape, about the size of a cherry, of a yellowish color, and containing an elongated bony nut, which is five-celled, each cell containing one seed.

History.—This tree is a native of many parts of Asia, but is extensively cultivated in the southern parts of Europe and the United States; it does not grow to any great extent north of Virginia, and flowers early in the spring. Its name of *Bead-tree*, was derived from the hard nuts contained in its berries, which are extensively used in Roman Catholic countries for the purpose of making rosaries. The fruit is sweetish, and is reputed powerfully vermifuge; the pulp of the fruit formed in the middle ages the basis of an ointment for the destruction of lice and other parasitic insects. The recent bark of the root is the part usually employed by practitioners in the south; it has a nauseous, bitter taste, and an unpleasant, virose smell, and yields its properties to boiling water. A fluid-extract might possibly be prepared from it, for more general use.

Properties and Uses.—The bark is anthelmintic, and in large doses, narcotic and emetic. It is said that if gathered at the season when the sap is rising, it will cause narcotic symptoms similar to spigelia. Useful in verminose fevers, and infantile remittents which resemble them, without being dependent on the presence of worms. Dose of the powdered bark, twenty grains; of the decoction, (which is the best form for administration, two ounces of the bark to one pint of water, and boiled down to half a pint,) a tablespoonful every few hours, till the desired effect is produced, to be followed by an active cathartic. An ointment prepared from the pulp of the berry, is said to be employed in Persia, in cases of *tinca-capitis*, and other obstinate cutaneous affections. The nuts yield an oil by expression, which is said to be anthelmintic, and useful as an application to rheumatic and spasmodic affections, and foul ulcers.

MELISSA OFFICINALIS.

Balm.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE HERB.

Description.—Balm has a perennial root, which sends up annually several erect, quadrangular stems, usually branched toward the base, and a foot or two in height. The leaves are opposite, broadly ovate or cordate, deeply serrate, pubescent above and smooth beneath, the lower ones on long petioles, the upper nearly sessile. The flowers are white or yellowish, upon short peduncles, and in axillary, dimidiate whorls; bracts few, ovate-lanceolate, petiolate. The calyx is tubular, pentangular, and bilabiate, with the upper lip three-toothed and flattened, the lower cut into two pointed teeth. The corolla is tubular and bilabiate, the upper lip less convex and notched, the lower three-cleft. Stamens ascending.

History.—Balm is a native of the south of Europe, but introduced into this country, growing in gardens, and in fields, by the sides of fences, roads, and lanes, flowering in June and July. The whole plant is officinal, and should be collected before the appearance of the flowers. When fresh, its odor very much resembles that of lemons, but when dried, it is nearly inodorous; its taste is somewhat austere and slightly aromatic, with a faint astringency, and a degree of persistent bitterness. Boiling water extracts its virtues. Balm contains a bitter extractive substance, a little tannin, gum, and a peculiar volatile oil. A pound of the plant yields about four grains of the oil, which is yellowish, or reddish-yellow, very liquid, 975 in density, and possessing the fragrance of the plant in a very high degree. The *Nepeta Citriodora*, a powerful emmenagogue, is sometimes cultivated and employed by mistake for balm. It has the same odor, but may be distinguished by having both surfaces of its leaves hairy.

Properties and Uses.—Balm is moderately stimulant, diaphoretic, and antispasmodic. A warm infusion drank freely, has been serviceable as a diaphoretic in febrile diseases, and painful menstruation, and to assist the operation of other diaphoretic medicines; in combination with ipecacuanha and nitre, it forms a valuable diaphoretic. It is also occasionally used to assist menstruation. When given in fevers, it may be rendered more agreeable by the addition of lemon juice. The infusion may be taken ad libitum.

Off. Prep.—Infusum Melissæ.

MENISPERMUM CANADENSE.

Yellow Parilla.

Nat. Ord.—Menispermaceæ. *Sex. Syst.*—Diœcia Polyandria.

THE ROOT.

Description.—This plant is also known by the names of *Sarsaparilla*, *Moonseed*, *Vine-maple*, etc.; it has a perennial, horizontal, woody, very long root, of a beautiful yellow color externally, and a round, striate, climbing stem, greenish-yellow when young, and from eight to twelve feet in length. The leaves are roundish, cordate, peltate, three to seven-angled or lobed, smooth, the petiole inserted near the base and from three to five inches long, and white lines radiating from the petiole on the upper surface to each angle, glaucous green above, paler below, entire, and four or five inches in diameter. The flowers are small, yellow, and disposed in axillary clusters; sepals four to eight, in a double row; petals four to seven, minute, retuse, shorter than the sepals. Stamens twelve to twenty in the sterile flowers; anthers four-celled. Pistils two to four in the fertile flowers, raised on a short stalk, one or two ripening into round drupes. Imperfect stamens are sometimes found in the fertile flowers. Drupes about four lines in diameter, black with a bloom resembling frost-grapes, one-seeded. Seeds crescent, compressed.

History.—The use of this plant is principally confined to Eclectics, its virtues being unknown to Allopaths. It grows in woods and hedges near streams, from Canada to Carolina and west to the Mississippi, flowering in July. The root is the officinal part, it has a bitter, persistent, but not unpleasant acrid taste, and yields its virtues to water or alcohol. It has not been analyzed.

Properties and Uses.—Yellow Parilla is tonic, laxative, alterative and diuretic. In small doses, no obvious effects are produced on the general system; but in larger doses, a slight increase of the volume of the pulse may be perceived, as well as an increase of the appetite, and the action of the bowels. In excessive doses, purging and vomiting will follow, but no other unpleasant effect. It is a superior laxative bitter. It is much esteemed as a remedy in scrofulous, cutaneous, arthritic, rheumatic, syphilitic, and mercurial diseases. Said to be superior to the imported Sarsaparilla. Likewise employed in dyspepsia, general debility, and chronic inflammation of the viscera. Externally, the decoction has been used with good effect as an embrocation in gouty and cutaneous affections. Dose of the decoction, from one to four fluidounces three times a day; of the extract, from two to six grains three or four times a day; of the saturated tincture, from half a fluidrachm to a fluidrachm.

The Franklin Pharmaceutical Institute of the City of New York, advertise the active principle of this root, under the name of *Menisperine*; it is stated to be a powder of a whitish-brown color, with a not unplea-

sant, bitter taste, and is recommended as an alterative, tonic, nervine and laxative. Said to be valuable in the treatment of scrofulous, cutaneous, syphilitic, and mercurial diseases, and superior to sarsaparilla as an alterative. Dose from one to three grains, three or four times a day. I have not been made acquainted with the process of manufacture, nor do I even know whether it is a secret preparation; but I have no doubt, from the known virtues of Yellow Parilla root as an alterative, that if its active principle can be obtained, it will prove a decidedly valuable medicine.

Off. Prep.—Decoctum Menispermi; Syrupus Rumicis Compositus.

MENTHA PIPERITA.

Peppermint.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE HERB.

Description.—Peppermint is a perennial, herbaceous plant, with a creeping root, and a quadrangular, channeled, purplish, nearly erect stem, with short recurved hairs, and about two feet in height. The leaves are opposite, on short petioles, ovate, serrate, acute, smoother on the upper than the under side, of a dark shining green color above and paler beneath; the midrib is furnished with short hairs. The flowers are small, purple, and disposed in short terminal, lax, obtuse spikes, interrupted and leafy below. The bracts are subulate, lanceolate, and fringed, the outer ones as long as the calyx. The peduncles are either smooth, or slightly hairy above. The calyx is tubular, slender, furrowed, and covered with pellucid dots, the base quite smooth, five-cleft, with the segments dark-purple, erect, subulate, fringed. The corolla is tubular, longer than the calyx, with its border divided into four segments, of which the uppermost is broadest and notched at its apex. The stamens are subulate, straight; the anthers concealed within the tube of the corolla. The ovary is four-lobed, superior, supporting a slender style longer than the calyx and terminated by a bifid stigma. The seeds are four, lodged in the calyx.

History.—Peppermint is a native of England, from whence it has been introduced into this country, where it is largely cultivated for the sake of its oil. It also grows wild in wet places. It flowers from July to September. It is said that the roots must be transplanted every three years in order to preserve the fragrance of the plant. The whole herb is officinal, and should be collected when the flowers commence their appearance, and dried in the shade. In the recent state all parts of the plant have a peculiar, powerful, penetrating, diffusive, aromatic odor, and an agreeable, warm, aromatic, pungent, camphorous, bitterish taste,

followed by a singular sensation of coolness when air is admitted into the mouth. Both the odor and taste are retained when the plant is dried, and may be preserved for a long time. Its virtues depend upon a volatile oil, which is contained in little vesicles existing throughout the plant, and visible in the leaves; and which may be obtained by distillation with water. It also contains a portion of tannic acid, as its infusion becomes dark-green with the salts of sesquioxide of iron. Its virtues are taken up in infusion by water, and more readily by alcohol.

Properties and Uses.—Peppermint is a powerful, diffusive stimulant, antispasmodic, carminative, and stomachic. Used in the treatment of gastrodynia, flatulent colic, hysteria, spasms or cramps of the stomach, to allay the griping of cathartics, to check nausea and vomiting, and to disguise the unpleasant taste of other medicines. The fresh herb bruised, and applied over the bowels, will often allay sick stomach, and is useful in the cholera of children. The infusion may be drank freely; but the most usual form of administration is the *essence*, made by dissolving one fluidrachm of the oil in one fluidounce of alcohol. Dose, from ten to sixty drops in sweetened water.

Off. Prep.—Aqua Menthæ Piperitæ; Extractum Rhei Fluidum; Infusum Menthæ Piperitæ; Mistura Camphoræ Composita; Mistura Cajuputi Composita; Oleum Menthæ Piperitæ; Pulvis Rhei Compositus; Tinctura Olei Menthæ Piperitæ.

MENTHA VIRIDIS.

Spearmint.

Nat. Ord.—Lamiaceæ. *Ser. Syst.*—Didynamia Gymnospermia.

THE HERB.

Description.—Spearmint has a perennial creeping root, from which arises annually several herbaceous, erect, branched, acutely four-angled, smooth, purplish *stems* from two to three feet in height. The *leaves* are of a bright-green color, lanceolate, oblong, acute, incisely serrate, nearly sessile, opposite, and sometimes a little hairy beneath. The stems and branches are terminated by long spikes of verticillate *flowers*, the whorls of which are somewhat distant, and furnished with narrow, lanceolate bracts; the pedicels are smooth. The *spikes* are slender, loose, cylindrical, interrupted, and attenuated above. The *calyx* is campanulate, usually smooth, with five equal teeth, and sprinkled, equally with the leaves, with minute dots. The *corolla* is funnel-shaped, smooth, and of a light-purple color; the *stamens* are generally shorter than the corolla, with roundish anthers. The *ovary* is four-lobed, with a filiform style, having a bifid stigma. The *seeds* are four, small, and often abortive.

History.—Spearmint is a native of Europe, but like the preceding species of mint, is extensively cultivated in various moist places in this

country for the sake of its oil, and for domestic use. It flowers in July and August. The whole plant is officinal, and should be gathered for medical use, just as the flowers appear in dry weather, and carefully dried in the shade. If gathered to obtain their oil, it should be done after the flowers have expanded. It has a peculiar, strong, aromatic odor, and a warm, aromatic, slightly bitter taste, weaker than that of peppermint, but like it leaving a cool sensation in the mouth when air is admitted. These properties are retained for some time by the dried plant. Its virtues are owing to a volatile oil, which may be obtained by distillation with water. Alcohol extracts its virtues, also water by infusion.

Properties and Uses.—The carminative, antispasmodic, and stimulant properties of Spearmint are somewhat inferior to those of Peppermint; its principal employment is for its diuretic and febrifuge virtues. As a febrifuge, it is superior to peppermint, and may be used freely in warm infusion. The cold infusion is beneficial in high color or scalding of urine, difficult micturition, etc.; it may be used alone, or in combination with marsh-mallow root. A saturated tincture of the fresh herb with gin has been found serviceable in gonorrhea, strangury, suppressed urine, gravel, and as a local application to painful hemorrhoids. The oil is diuretic, stimulant, antispasmodic, and rubefacient, and is used externally in rheumatic and other pains. Dose, same as peppermint.

Off. Prep.—Aquæ Menthæ Viridis; Infusum Menthæ Viridis; Mixture Camphoræ Composita; Pilulæ Taraxaci Compositæ; Pilulæ Saponi Compositæ; Tinctura Menthæ Viridis; Tinctura Olei Menthæ Viridis.

MENYANTHES TRIFOLIATA.

Buckbean.

Nat. Ord.—Gentianaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES AND ROOT.

Description.—This plant is also known by the names of *Bog-bean*, *Marsh-trefoil*, *Water-shamrock*, etc.; it has a perennial, long, round, horizontal, branching, dark-colored root or rhizoma, about as thick as the finger, and sending out numerous fibers from its under surface; it is regularly intersected by joints about half an inch from each other, and which are formed by the breaking off of the old petioles and their sheaths. The *scape* is erect, round, smooth, from six to twelve inches high, longer than the leaves, and terminated by a conical raceme of flowers. The *leaves* are ternate, and stand upon long striated petioles which proceed from the end of the root, and are furnished at their base with sheathing stipules; the leaflets are obovate, obtuse, entire or bluntly denticulate, very smooth, green on their upper surface, and paler beneath. The *flowers* are of a pale lilac or flesh color on thick pedicels, with ovate-

concave bracts at base. The *calyx* is erect, somewhat campanulate, five-parted, persistent. The *corolla* is funnel-shaped, with a short tube, deeply cleft into five spreading or recurved, pointed segments, of a white color tipped with rose, smooth externally, and covered on the inner surface with dense, white, shaggy fibers. The *stamens* are five, shorter than the corolla, and alternate with its segments; *anthers* red, and oblong-sagittate. The *ovary* is ovate, supporting a slender style longer than the stamens, and terminating in a bifid and compressed stigma. The *fruit* is an ovate, succulent, two-valved, one-celled capsule, containing numerous minute, roundish seeds.

History.—Buckbean is a native of Europe and America, growing in moist boggy soils, or even in ponds and ditches, in temperate or cold climates, and in this country flowering in May. In England it flowers in June and July. The whole plant is medicinal, but the leaves and root only are the officinal parts. The odor of the leaves is faint and disagreeable, and the whole plant has an intensely bitter taste. Water or alcohol takes up its active properties. It contains albumen, chlorophylle, a peculiar substance precipitable by tannin, but soluble in water, fecula, malic acid, bitter extractive, etc. Its virtues depend on a bitter principle, called *menyanthin*, which may be obtained sufficiently pure for use by treating the spirituous extract of the plant with hydrated oxide of lead, removing the lead by hydrosulphuric acid, filtering and evaporating the liquor, exhausting the residue with alcohol, and again evaporating with a gentle heat. It has a pure bitter taste, is soluble in water or alcohol, but not in pure ether, and is chemically neuter.

Properties and Uses.—Buckbean is tonic and astringent in small doses; in large ones cathartic, and sometimes emetic, especially when fresh. It has been given in dyspepsia, intermittent and remittent fevers with advantage; and has been highly recommended in chronic rheumatism, hepatalgia, dropsy, worms, and some cutaneous diseases, and as a tonic in scrofula and various cachectic affections. Dose of the powdered leaves or root as a tonic, from twenty to thirty grains; of an infusion, prepared with half an ounce of the root to a pint of boiling water, from one to two fluidounces; of the extract five or ten grains, to be repeated three or four times a day. As a purgative, sixty grains of the powder, or a gill of the infusion will generally answer, and will occasionally cause vomiting.

MITCHELLA REPENS.

Partridgeberry.

Nat. Ord.—Rubiaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE VINE.

Description.—This is an indigenous evergreen herb, with a perennial root, from which arises a smooth and creeping stem, furnished with

roundish-ovate, or slightly heart-shaped, petiolate, opposite, flat, coriaceous, dark-green and shining *leaves*, usually variegated with whitish lines. The *flowers* are white, often tinged with red, very fragrant, in pairs, with their ovaries united. *Calyx* four-parted. *Corolla* funnel-form, two on each double ovary, limb four-parted, spreading, densely hairy within. *Stamens* four, short, inserted on the *corolla*. *Style* slender; *stigmas* four. *Fruit* a dry berry-like double drupe, crowned with the calyx-teeth of the two flowers, each containing four small and seed-like bony nutlets. Some plants bear flowers with exserted stamens and included styles; others, conversely, those with included stamens and exserted styles.

History.—This plant is indigenous to the United States, growing in dry woods, among hemlock-timber, and in swampy places, flowering in June and July. The leaves bear some resemblance to clover, and remain green through the winter. The fruit or berry is bright scarlet, edible, but nearly tasteless, dry and full of stony seeds, and also remains through the winter. The plant is sometimes called *Checkerberry*, *Winter-clover*, *Deerberry*, *Squaw-vine*, *Oneberry*, etc. The whole plant is officinal, and imparts its virtues to boiling water or alcohol. It has not been analyzed.

Properties and Uses.—Partridge-berry is parturient, diuretic and astringent. Used in dropsy, suppression of urine, and diarrhea, in decoction. It seems to have an especial affinity for the uterus, and is highly beneficial in all uterine diseases. It is said that the squaws drink a decoction of this plant for several weeks previous to their confinement, for the purpose of rendering parturition safe and easy. It appears to exert a powerful tonic and alterative influence on the uterus. The remedy is peculiarly Eclectic, not being noticed or used by other practitioners. Dose of a strong decoction, from two to four fluidounces, two or three times a day. The berries are a popular remedy for diarrhea, and dysury. Used as follows, partridge-berry is highly recommended as a cure for sore nipples: Take two ounces of the herb, fresh if possible, and make a strong decoction with a pint of water, then strain, and add as much good cream as there is liquid of the decoction. Boil the whole down to the consistence of a soft salve, and when cool, anoint the nipple with it every time the child is removed from the breast.

Off. Prep.—Extractum Mitchellæ; Syrupus Mitchellæ Compositus.

MOMORDICA ELATERIUM.

Wild Cucumber.

Nat. Ord.—Cucurbitaceæ. *Ser. Syst.*—Monœcia Monadelphia.

THE FECULENCE OF THE JUICE OF THE FRUIT. ELATERIUM.

Description.—The *Wild* or *Squirting Cucumber* is a perennial plant, with a large fleshy root, from which proceed several thick, round, rough,

trailing *stems*, divided into many branches, but destitute of tendrils. The *leaves* are large, rough, irregularly cordate, somewhat lobed, crenate-toothed, hairy, of a grayish-green color above, paler beneath, and supported on long petioles. The *flowers* are axillary, of a straw-yellow color, and both male and female on the same plant. The males are on short peduncles, the female, sessile on the ovary. The *calyx* five-cleft, with a very short tube. The *corolla* is composed of five acute segments, tomentose and veined with green. The *stamens* are short, inserted into the base of the corolla, and support recurved, double-headed, orange-colored *anthers*; the *style* is short, cylindrical, three-cleft, and terminated by an oblong stigma. The *fruit* is watery, of a coriaceous texture, pendulous, oblong, like a small oval cucumber, obtuse at each end, of a greenish or grayish color, about an inch and a half long, an inch thick, and closely set with short bristles. When fully ripe it separates from the peduncle with violence, and expels its juice and seed with considerable force, through an opening at the base, where it was attached to the footstalk, and which is owing to the sudden contraction of the sides of the pepo.

History.—The Wild Cucumber is the *Ecbalium Elaterium* of some botanists; it is a native of the South of Europe, growing on poor soils, in waste places, and flowering in July. It has been extensively cultivated in England for medicinal purposes, where, however, it perishes in the winter; and being a hardy plant it will grow in most parts of the United States, without much attention. The officinal part of the plant is the juice around the seeds, and which, when properly prepared, forms the *elaterium* of commerce. It must be collected a little before the period of ripening. When the fruit is sliced and placed upon a sieve, a perfectly limpid and colorless juice flows out, which after a short time becomes turbid, and in the course of a few hours begins to deposit a sediment. This when collected and carefully dried, is very light and pulverulent, of a yellowish-white color, slightly tinged with green. It is the genuine elaterium, and was found by Clutterbuck to purge violently in the dose of one-eighth of a grain. But the quantity contained in the fruit is exceedingly small; Clutterbuck obtained only six grains from forty pepos or cucumbers. Commercial elaterium is a much weaker medicine, owing in part, perhaps, to adulteration, but much more to the mode in which it is prepared. In order to increase the product, the juice of the fruit is often expressed with force; and there is reason to believe that it is sometimes evaporated so as to form an extract, instead of being allowed to deposit the active matter. The French elaterium is prepared by expressing the juice, clarifying it by rest and filtration, and then evaporating it to a suitable consistence. As the liquid which remains after the deposition of the sediment is comparatively inert, it will be readily perceived that the preparation of the French Codex must be relatively feeble. The following are the directions of the London

College, with which those of the Dublin College essentially correspond. "Slice ripe wild cucumbers, express the juice very gently, and pass it through a very fine hair sieve; then set it aside for some hours until the thicker part has subsided. Reject the thinner, supernatant part, and dry the thicker part with a gentle heat." As this process is performed at Apothecaries' Hall, the juice after expression, is allowed to stand for about two hours, when the supernatant liquor is poured off, and the matter deposited is carefully dried, constituting the finest elaterium. Another portion of a paler color, is deposited by the decanted liquor. It is incorrectly denominated by the London and Dublin Colleges *Extractum Elaterii*, as it is neither an extract, strictly speaking, nor an inspissated juice. In the Pharmacopœias of the United States and Edinburgh, it is named simply *Elaterium*. As the plant is not cultivated in this country for medicinal purposes, our text-books very properly adopt as officinal, the medicine as it is found in commerce. It is brought chiefly from England; but probably some of the elaterium prepared in Malta, reaches our market also. As elaterium is insoluble in water, the inquiry has arisen as to what kept it in a state of solution in the juice. Dr. A. T. Thomson suggests that the elaterium does not exist in a formed state in the juice, and is the result of an absorption of oxygen by the fluid, as this is at first nearly colorless and transparent, and does not become turbid or make any deposit until it has been exposed to the action of the air; if the progress of this change be examined by means of a microscope, it will be seen that there is a gradual formation of minute crystals, mingled with vegetable matters. The elaterium of the shops, therefore, consists of these crystals, elaterin, mixed with green coloring matter, cellular tissue, starch, etc., and according to the care taken in the preparation, will be the proportional quantity of this active principle, as it varies from five to forty-four per cent.

Good Elaterium is in light, thin, friable, flat or somewhat curled fragments, of a pale, grayish-green color, changing to yellowish by exposure, often bearing the impression of the muslin upon which it was dried, having a faint, animal odor, and of an intensely bitter, somewhat acrid taste. It is pulverulent and inflammable, and so light that it swims upon water. Alcohol is its best solvent. Dr. Paris found it to contain 28 per cent. of starch, 26 extractive matter, 25 ligneous fiber, 5 gluten, a little moisture, and 12 of chlorophylle and elaterin in union. According to Mr. Hennel, 100 parts of elaterium contain 44 of elaterin, 17 of chlorophylle, 6 of starch, 27 of lignin, and 6 of saline matters.

When elaterium is of inferior quality it is dark-colored, much curled, rather hard, breaking with difficulty or presenting a resinous fracture; it does not yield over 6 per cent. of elaterin, while the best elaterium yields from 15 to 25 per cent. The *Maltese Elaterium* is of a pale color, frequently without the slightest tinge of green, in larger pieces, soft, friable, inodorous, sinks in water, and is often mixed with starch or chalk.

Elaterin is the principle in which the active properties of the drug reside. It may be obtained by thoroughly exhausting elaterium with boiling alcohol, concentrating the tincture to the consistence of thin oil, or so long as no separation takes place, and then pouring it while hot into a weak boiling solution of potassa. The potassa retains the chlorophylle or green resin in solution, and the elaterin crystallizes as the liquor cools. When pure, elaterin is in very delicate, colorless crystals, which are striated satiny prisms, with a rhombic base. It is permanent in the air, inodorous, but of an extremely bitter and somewhat acrid taste, insoluble in water and alkaline solutions, soluble in alcohol, and hot olive oil, and slightly soluble in ether, diluted acids, and fixed oils. It fuses at a temperature between 300° and 400° , and at a higher temperature it is decomposed, with the evolution of thick, white, acrid vapors, having an ammoniacal odor. It is a neutral body containing no azote, but having the constitution $C_{20}H_{14}O_5$.

Elaterium is seldom adulterated; its variableness of strength depends probably more upon its mode of preparation, or the time of its collection. It should be light, pale grayish-green, and friable, not brown or compact, should not effervesce with acids, and should yield from 15 to 25 per cent. of elaterin on analysis.

Properties and Uses.—Elaterium is a powerful hydragogue cathartic, operating with great violence in doses of a few grains, causing diffuse inflammation of the stomach and bowels, characterized by vomiting, griping pain, and profuse diarrhea. In ordinary medicinal doses it produces copious watery evacuations, attended with considerable depression of the circulation and nervous system, and most generally nausea and vomiting. Hence, it is often used in dropsy, to aid in removing the effused fluid, as a revulsive in cerebral affections, and wherever a hydragogue or revellent effect is indicated. It also increases the flow of urine. The dose of the common commercial article is from a quarter to half a grain, administered every hour or two until it operates; of Clutterbuck's elaterium, which is the best, and is so named because it is prepared after the process recommended by Clutterbuck, from one-eighth of a grain to one-tenth, every three or four hours; of *elaterin*, from one-sixteenth of a grain to one-twelfth, and is best given in solution. An excellent purgative solution is made with one grain of *elaterin*, a fluid-ounce of alcohol, and four drops of nitric acid; of which from thirty to forty drops may be given diluted with water.

Off. Prep.—*Pilulæ Gambogiæ Compositæ.*

MONARDA PUNCTATA.

Horsemint.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Diandria Monogynia.

THE HERB.

Description.—Horsemint is an indigenous perennial or biennial plant, with a fibrous root, and a *stem* two or three feet high, herbaceous, obtusely four-angled, whitish, downy, and branching. The *leaves* are oblong-lanceolate, remotely-serrate, smooth, punctate, tapering to a short petiole. The *flowers* are yellow, spotted with red or brown, and disposed in numerous dense, axillary whorls, having lanceolate, yellowish and purple, sessile bracts, obtuse at the base, and longer than the whorls. *Calyx* tubular, downy; *calyx-teeth* unequal, short and rigid, awnless. *Corolla* nearly smooth, yellow with brown spots, the upper lip villous at the apex, somewhat vaulted, and spotted with purple; the tube scarcely exceeding the calyx. *Stamens* two, not exceeding the upper lip of the corolla.

History.—This plant is found growing in light and sandy soils from New Jersey to Florida, and in the Western States to Louisiana, flowering from June to September. The whole plant has an aromatic odor and a warm, pungent, somewhat bitter taste, and abounds in a powerful volatile oil on which its active virtues depend. The oil may be obtained from the fresh herb by distillation with water. The plant yields its virtues to alcohol or infused in boiling water.

Properties and Uses.—Horsemint is stimulant, carminative, sudorific, diuretic and anti-emetic. The infusion or essence used in flatulence, nausea, vomiting, and as a diuretic in suppression of the urine, and other urinary disorders. The warm infusion is a stimulating diaphoretic, and has acquired some reputation as an emmenagogue; it may be drank freely. The *M. Didyma* and *M. Squarrosa* may be used as substitutes for the above.

Off. Prep.—Infusum Monardæ; Oleum Monardæ.

MONOTROPA UNIFLORA.

Iceplant.

Nat. Ord.—Ericacæ; *Suborder*, Monotropææ. *Sex. Syst.*—Decandria Monogynia.

THE ROOT.

Description.—This plant, also known by the names of *Ova-ova*, *Bird's Nest*, *Indian-pipe*, *Fit-plant*, etc., has a dark-colored, fibrous, perennial root, matted in masses about as large as a chestnut-burr, from which arise one or more short, ivory-white *stems*, from four to eight inches high, furnished with sessile, lanceolate, white, semi-transparent, approxi-

mate leaves or bracts, and bearing a large, white, terminal, solitary flower, which is at first nodding, but becomes upright in fruit. The *calyx* is represented by from two to four scale-like deciduous bracts, the lower rather distant from the corolla. The *corolla* is permanent, and composed of five distinct, erect, fleshy petals, which are narrowed below and have a small nectariferous pit at the base. *Stamens* ten, sometimes eight; *anthers* short on the thickened apex of the hairy filament, two-celled, opening by transverse chinks. *Stigma* five-crenate, depressed, beardless. *Pod* or *capsule* five-celled, five-valved; *seeds* numerous, invested with an arillus-like membrane.

History.—This is a singular plant, found in various parts of the Union from Maine to Carolina, and westward to Missouri, growing in shady, solitary woods, in rich moist soil, or soil composed of decayed wood and leaves, and near the base of trees, on whose roots it is said to be parasitic. The whole plant is ivory-white in all its parts, resembling frozen jelly, and is very succulent and tender, so much so that when handled it dissolves and melts away in the hands like ice. The flowers are inodorous, and appear from June until September; their resemblance to a pipe has given rise to the names *Indian Pipe*, or *Pipe-plant*. The root is the part used; it should be gathered in September and October, carefully dried, pulverized, and kept in well-stopped bottles.

Properties and Uses.—Iceplant-root is tonic, sedative, nervine, and antispasmodic. It has also been employed in febrile diseases, as a sedative, and diaphoretic. The powder has been employed in instances of restlessness, pains, nervous irritability, etc., as a substitute for opium, without any deleterious influences. It is reputed to have cured remittent and intermittent fevers, and to be an excellent antiperiodic. In convulsions of children, epilepsy, chorea, and other spasmodic affections, its administration has been followed with prompt success; hence its common name, *Fit* or *Convulsion-root*. The juice of the plant, alone or combined with rose-water, has been found an excellent local application to obstinate ophthalmic inflammations, to ulcers, and as an injection in gonorrhea, inflammation and ulceration of the bladder. Dose of the powdered root, from half a drachm to a drachm, two or three times a day.

This plant is undoubtedly one of great value, and deserving of more confidence and attention than is at present bestowed upon it. It is not the *Mesembryanthemum Crystallinum* or Iceplant of Europe, which has a creeping stem a foot or more in length, with large, ovate, wavy, frosted leaves, and white flowers; and the whole plant is covered over with frost-like, warty protuberances, which give a very singular aspect to it.

MORUS RUBRA.

Red Mulberry.

Nat. Ord.—Urticacæ; *Suborder*, Moreæ. *Sex. Syst.*—Monœcia Tetrandria.

THE FRUIT.

Description.—*Morus Rubra*, or the *Red Mulberry*, is but a shrub in the northern and New England States, from fifteen to twenty feet high, but in the Middle and Western States it attains an elevation of from fifty to sixty feet, with a diameter of two feet, and covered with a grayish, furrowed, much broken bark. The leaves are alternate, rounded or subcordate at base, acuminate, equally serrate, either ovate or three-lobed, rough above and pubescent beneath, thick, dark-green, from four to six inches long, and about two-thirds as wide. The flowers are small, monœcious, rarely diœcious; the sterile ones in loose spikes; calyx four-parted; the fertile ones in dense spikes; calyx four-parted; styles two, filiform, stigmatic down the inside. Ovary two-celled, one of the cells smaller and disappearing. Achenium ovate, compressed, inclosed within the succulent, berry-like calyx. Fertile spikes cylindric, constituting a dark-red, thickened, oblong and juicy, compound berry or fruit. The sterile spikes are rather slender.

History.—The red mulberry is indigenous to the United States, growing in rich woods, flowering in May, and ripening its fruit in July. The wood of the tree is fine-grained, strong, and durable. The fruit is oblong-oval, of a dark-red color, almost black, and consists of minute berries united together and attached to a common receptacle, each containing a single seed, the succulent envelope of which is formed by the calyx. It somewhat resembles a blackberry, is inodorous, but with a sweet, mucilaginous, acidulous taste, and is very juicy. They are said to consist of bitartrate of potassa, pectine, sugar, lignin, coloring matter and water.

Properties and Uses.—Mulberries possess very slightly nutritive qualities; they are refrigerant and laxative, and their juice forms a pleasant and grateful drink for patients suffering under febrile diseases, as it checks thirst, relieves febrile heat, and when taken freely, gently relax the bowels. A syrup made from the juice, and added to water, answers the same purpose, and forms a pleasant addition to gargles in quinsy. If the berries are eaten to excess they are apt to induce diarrhea. The bark of the tree is said to be cathartic and anthelmintic, having expelled tapeworm. The *Morus Nigra* of Europe possesses similar properties. The *Morus Alba*, a native of China, with white fruit which is sweeter and less grateful than the others, is the kind cultivated as a source of food for the silk-worm.

MOSCHUS.

Musk.

History.—This article is obtained from the *Moschus Moschiferus*, wild ruminating animal, rather larger than the domestic goat, and approaching the deer in its characters, and which is an inhabitant of Central Asia. At the posterior part of its abdomen, there is a small sack situated immediately under the skin, which opens a little in front of the preputial orifice, and which is filled with a thick fluid, abounding particularly in the rutting season. This fluid, in the dried state, is musk. It is removed from the animal in its containing bag, and dried in this state for exportation. The musk-bag, or pod is usually plano-convex and in general the plain surface is a bare membrane, while the convex surface is covered with stiff hairs; but sometimes the hairy and membranous parts are reversed. It weighs, along with its contents, between five and nearly ten drachms, and contains on an average two drachms and two-thirds of musk. Musk is in the form of irregular, reddish black, rather unctuous grains, possessing an overpowering, most penetrating, diffusive odor, and a bitterish, corresponding taste. Rectified spirit is its best solvent. Musk is now scarcely ever prescribed, both on account of its high price, and the extreme difficulty of obtaining a pure article; as nearly all the musk of the shops, at the present day, is an artificial or factitious article. Camphor, cinnamon, almond syrup, wax, etc., when mixed with musk, destroy its odor.

Musk is inflammable, burning with a white flame, and leaving a light spongy charcoal. In some individuals its odor produces headache and other disagreeable symptoms, and has even given rise to convulsions. It consists of a great number of proximate principles, as stearin, elain, cholesterin, a peculiar fixed acid, resin, osmazome, numerous salts, and free ammonia combined with an odoriferous principle, and which has not yet been separately detached. Ether is said to be a good solvent, and the emulsion or syrup of bitter almonds, or cherry laurel-water, very much diminishes its odor.

From its high price, musk is very liable to adulterations; indeed it is very rare that the pure article can be had at the shops in this country. These adulterations are very difficult to detect. Musk which burns with difficulty, which has a feeble odor, and a color either pale or entirely black, which feels gritty to the finger, is very moist, or contains obvious impurities, should be rejected.

Properties and Uses.—Musk is stimulant and antispasmodic; it increases the vigor of the circulation, and exalts the nervous energy without causing any great derangement of the purely cerebral functions. It is asserted to have been used with much advantage in the following diseases: in all spasmodic affections, typhus, and low forms of fever, obstinate hiccough, pertussis, convulsions of infants, epilepsy, hysteria

asthma, palpitation of the heart, chorea, colic, etc. Fifteen grains of musk combined with extract of valerian, and hydro-alcoholic extract of cimicifuga, of each, fifteen grains, and divided into fifteen pills, will be found beneficial in pneumonia accompanied by delirium, and in the involuntary movements observed in low typhoid fevers. One pill may be given every hour or two, until there is a marked improvement in the symptoms. In small doses musk is hypnotic. If its use is long continued it imparts its peculiar odor to the secretions. It should always be given in substance, either in the form of pill or emulsion. Dose from five to twenty grains, every two or three hours. Nitre, cochineal of each two grains, musk one grain, mix and form a powder. This powder given and repeated every two or three hours is said to be very useful in some low forms of fever, and in febrile or inflammatory affections with spasmodic action or delirium. An *artificial musk* is prepared, by carefully adding, drop by drop, three parts of fuming nitric acid to one of unrectified oil of amber. The acid is decomposed, and the oil converted into an acid resin, which must be kneaded under pure water, until all excess of acid is removed. The substance which remains is of a yellowish-brown color, viscid, and an odor similar to musk, for which it may be used as a substitute in doses of from fifteen to thirty grains.

MUCUNA PRURIENS.

Cowhage.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Diadelphia Decandria.

THE BRISTLES OF THE PODS.

Description.—This plant has a perennial and fibrous *root*, from which arises a herbaceous, climbing, cylindrical, tomentose *stem*, divided into many branches, and which rises to a considerable height, twining round the trees in its vicinity. The leaves are alternate, on long petioles, about a foot from each other, and pinnately-trifoliate; the central *leaflet* is rhomboidal; the two lateral ones, oblique at the base, dilated externally; all of them are entire, ovate, acuminate, smooth on the upper surface, and hairy beneath. The *flowers* are large, inodorous, of a purplish or violet color, somewhat resembling those of the pea in form, and are usually collected by threes in long, pendulous, axillary racemes. The *calyx* is hairy, pink, campanulate, bilabiate, the lower lip trifid, and the upper entire, semi-ovate. The *corolla* consists of a vexillum, which is roundish, concave, and double the length of the calyx, but shorter than the other petals. The *carina* is straight, obtuse, and furnished on each side of the apex with a short spur. The *alæ* are oblong, and as long as the carina. The *stamens* are ten, diadelphous, five of them supporting oblong, linear anthers, and the others ovate, hirsute ones. The *ovary* is oblong, villous, and furnished with a slender style, with a small

orbicular stigma. The *legume* is a coriaceous pod about three or four inches long, the thickness of the finger, compressed, curved like the letter S, thickly set with short, reddish-brown, brittle, stinging hairs, somewhat terete and keeled; when handled or rubbed on the skin, they produce an intense itching sensation. The seeds are oval-oblong, brown or variegated, with a white hilum.

History.—This plant is a native of the West Indies, and other tropical parts of South America; it is found in woods, along river courses, upon fences, and in waste, neglected places. The East Indian species, *Mucuna Prurita*, is entirely distinct from the one under consideration. The officinal part of the plant is the hair of the pods, which are generally imported into this country attached to pod, and from which they are carefully removed, so that they do not fasten to the operator's hands.

Properties and Uses.—Cowhage is a mechanical anthelmintic, acting by penetrating the body of the worms; its decoction or tincture has no anthelmintic properties. It is used in the treatment of intestinal worms, which are expelled alive. It has no effect on tenia, but appears more serviceable in removing the lumbrici and ascarides. Dose, from one drachm to half an ounce in syrup or molasses, and followed, a few hours afterward, by a purgative. The application of oil is the best to allay the heat and itching it produces when rubbed on the skin. Cowhage has been recommended in the form of an ointment, as a cutaneous irritant, in the place of croton oil, and tartar-emetic, also as a good medium for the endermic application of various substances, as muriate of morphia. The proportions are, seven grains and a half of the hairs of cowhage to an ounce of lard. This must be rubbed in from ten to twenty minutes; seven or eight grains are usually sufficient. The immediate effect is the production of a sensation resembling stinging with nettles; but the burning sensation and the itching diminish during the friction, and entirely pass off in less than half an hour. The skin generally becomes covered with white flat papulæ, which soon disappear, leaving a sensation of heat. It produces no inconvenience, and children bear it easily.

MYRICA CERIFERA.

Bayberry.

Nat. Ord.—Myricaceæ. *Sex. Syst.*—Diœcia Tetrandria.

THE BARK AND WAX. BAYBERRY WAX.

Description.—This plant, known also by the names of *Wax Myrtle*, *Wax-berry*, etc., is a branching, half-evergreen shrub from one to twelve feet in high, and covered with a grayish bark. The *leaves* are glabrous, cuneate-lanceolate, rather acute or obtuse, distinctly petiolate, margin entire, but more frequently remotely dentate, particularly toward the

end, paler and with distinct veinlets beneath, generally twisted or revolute in their mode of growth, shining and resinous, dotted on both sides, and from an inch and a half to two and a half inches in length, by half an inch to three-quarters wide. The *flowers* appear in May before the leaves are fully expanded. The *males* grow in aments, which are sessile, erect, from six to nine lines in length; originating from the sides of the last year's twigs. Every flower is formed by a concave rhomboidal scale, containing three or four pairs of roundish anthers on a branched footstalk. The *females*, which are on a different shrub, are less than half the size of the males, and consist of narrower scales, with each an ovate ovary, and two filiform styles. To these aments succeed clusters or aggregations of small globular *fruits* resembling berries, which are at first green, but finally become nearly white. They consist of a hard stone inclosing a dicotyledonous kernel. The stone is studded on its outside with small black grains resembling fine gunpowder, over which is a crust of dry greenish-white wax, fitted to the grains and giving the surface of the fruit a granulated appearance. The *fruit* is persistent for two or three years.

History.—This plant is found in damp places in many parts of the United States, and is very abundant in New Jersey. The bark of the root is the officinal part; boiling water extracts its astringent principles, and alcohol its stimulating. It probably contains tannin, gallic acid, extractive matter, and lignin. The root should be collected late in the fall, cleansed from dirt and foreign substances, and then while fresh, pounded with a hammer or club to separate the bark, which should be thoroughly dried without exposure to a wet or moist atmosphere, then pulverized, and kept in darkened and well-closed vessels. The berries of this plant are studded over with small, black granulations, and covered by a white, mealy crust, consisting of a kind of wax, which is separated by placing the berries in boiling water, when it will melt and collect on the surface of the fluid, and on becoming cool, congeals into a concrete substance. Bayberry or Myrtle Wax, as it is sometimes called, is of a pale, grayish-green color, somewhat diaphanous, more brittle, and at the same time more unctuous to the touch than beeswax, of a feeble odor, and a slightly bitterish taste. It is insoluble in water, scarcely soluble in cold alcohol, soluble in boiling alcohol, but not permanently so in boiling ether, and slightly so in oil of turpentine. One hundred parts of wax contain eighty-seven parts of cerin, and thirteen of myricin. The wax boiled with ether, may be obtained colorless as the liquid cools, while the ether holds the green substance in solution. A bushel of bayberries will yield about four pounds of wax.

Properties and Uses.—Bayberry Bark is astringent and stimulant, and in drachm doses, it is apt to occasion emesis. The bark has been successfully employed in scrofula, jaundice, diarrhea, dysentery, and other

diseases where astringent-stimulants were indicated. The powdered bark, combined with bloodroot, forms an excellent application to indolent ulcers, and has likewise been employed as a snuff for the cure of some forms of nasal polypus. In the form of poultice, with elm, or alone, is a valuable application to scrofulous tumors or ulcers. The decoction is beneficial as a gargle in sore mouth and throat, and is of service in injection, in leucorrhea and fistula, and also as a wash for ulcers, tinea-capitis, etc. It also forms an excellent gum wash, for tender, spongy, and bleeding gums. The leaves are reputed antispasmodic, antiscorbutic and astringent. Probably the *M. Pennsylvanica*, *M. Carolinensis*, and *M. Gale*, possess similar properties. The Bayberry Wax is astringent and slightly narcotic, and has been successfully employed in epidemic typhoid dysentery. It is also used in the form of plaster, as an application to scrofulous and other ulcers. Dose of the powdered bark, from twenty to thirty grains; of the wax, one drachm; of the decoction of the leaves or bark, from two to four fluidounces.

Off. Prep.—Cataplasma Myricæ; Decoctum Myricæ; Extractum Myricæ; Emplastrum Myricæ; Lotio Lobeliæ Composita; Pulvis Aselepiæ Compositus; Pulvis Myricæ Compositus; Unguentum Myricæ.

MYRICIN.

Myricin.

DRIED ALCOHOLIC EXTRACT OF BAYBERRY BARK.

Preparation.—I am indebted to Drs. Hill & Co., of this city, for a description of the mode of preparing this article. Make a saturated tincture of Bayberry Bark, filter, distil off a portion of the alcohol, evaporate the remainder by means of a water-bath until the mass is of a syrupy or semifluid consistence, then spread it in thin layers on glass or metallic plates, and allow it to dry by spontaneous evaporation, which will require several weeks.

Some manufacturers precipitate the myricin from the tincture, by water, similar to the method employed for obtaining podophyllin; the article obtained by this process is lighter colored than that had by the above, and the yield is much less, beside a great portion of the astringency of the myricin is taken up by the water, and the agent possesses merely stimulant, with but slight astringent virtues.

History.—The profession are indebted to Messrs. F. D. Hill & Co., of this city, for first preparing and introducing this elegant article to their notice. It forms a light grayish-brown powder, with a peculiar, spicy smell, and a peculiar, bitterish-astringent taste, with some degree of persistent pungency. It is soluble in alcohol, partially soluble in ether, and its astringency is taken up by water, the rest being insoluble. Sulphate of iron forms a black inky liquid with the water in which

myricin has been agitated. It is perfectly soluble in water to which ammonia has been added.

Properties and Uses.—Myricin is a stimulant and astringent, and will be found a very advantageous remedy in chronic diarrhea and dysentery, in dysentery with typhoid symptoms, and in colliquative diarrhea of phthisis; in scarlatina it may be given with advantage, while a decoction of the bark is employed as a gargle; it will likewise be found a useful remedy for aphthous affections, when given internally, and applied locally. It forms an efficacious application to tender, spongy, bleeding gums, and an excellent snuff for polypus, also for headache and catarrhal affections. It is likewise beneficial in jaundice, and in combination with leptandrin and apocynin, I have successfully treated several cases of this affection. In some instances of cholera, it will be serviceable, given in combination with geraniin. Combined with leptandrin, podophyllin, or some other cathartic, it may be employed with benefit in the latter stages of typhoid fever. Dose, from two to ten grains of the powder, which may be repeated as often as required.

MYRISTICA MOSCHATA.

Nutmeg.

Nat. Ord.—Myristicaceæ. *Sex. Syst.*—Dioecia Monadelphia.

THE KERNELS OF THE FRUIT.

Description.—This is a tree from twenty to twenty-five feet high, having a grayish-brown and somewhat smooth bark, abounding in a yellow juice, and furnished with many whorls of spreading branches. The *leaves*, which are alternate and on petioles from half to three-fourths of an inch long, plane above, are oblong, approaching to elliptical, sub-bifarious, glabrous, rather obtuse at the base, acuminate, quite entire, aromatic, dark-green and somewhat glossy above, paler beneath, with simple parallel veins, and from three to six inches long. The *flowers* are male and female upon different trees, minute, and pale yellowish; the *males* are disposed in axillary, solitary clusters, from three to five on a peduncle. The *calyx* is urceolate and petaloid, thick and of a fleshy texture, indistinctly reddish-pubescent, dingy pale-yellow, and divided into three erect teeth. The *stamens* are united into a thickened, whitish, cylindrical column, about as long as the calyx, the upper half bearing from six to ten connate, linear-oblong, two-celled anthers, free at their base, and opening longitudinally. The *peduncles* and *pedicels* are glabrous, the latter having a quickly deciduous, ovate bract at its summit, often pressed close to the flower. The *female flowers* are scarcely different from the male, except that the pedicel is frequently solitary. *Pistil* solitary, shorter than the calyx, broadly ovate, a little tapering upward into a short style, and terminating in a two-lobed

persistent stigma. The *fruit* is pyriform, pendent, having a fleshy pericarp opening by two, nearly equal, longitudinal valves, yellowish, almost white within, four or five lines thick, and abounding in an astringent juice. The *arillus* (mace), is thick, between horny and fleshy, much lacinated, folded and anastomosing toward the extremity, almost enveloping the nut, and so tightly as to form inequalities on its surface; when fresh, it is brilliant scarlet; when dry, much more horny, of a yellow-brown color, and very brittle. The *nut* is oval or broadly ovate, with a hard, rugged, dark-brown, shining *shell*, marked by the mace, pale and smooth within, and about half a line thick; it closely envelops the seed, and its inner coat dips down into the substance of its albumen, giving it a marbled appearance. The *seed* or *nutmeg* is oval, pale-brown, quite smooth when fresh, but soon becomes shriveled, with irregular, vertical lines or furrows on its surface. Its substance or *albumen* is firm, fleshy, and whitish, being traversed by veins of a red-brown color, abounding in oil. Near the base of the albumen, and imbedded in a cavity in its substance, is the *embryo*, which is small, fleshy, yellowish-white, rounded below, and where is found the hemispherical radicle; its *cotyledons* of two, large, somewhat foliaceous, plicate lobes, in the center of which is seen the plumule.

History.—The nutmeg tree is a native of the Molucca Isles, and is cultivated in Sumatra, French Guiana, the Mauritius, and various West Indian islands. The tree is produced from the seed, and does not flower until the eighth or ninth year, when it continues to bear fruit and flowers together, for sixty or seventy years. Its cultivation is said to require but little trouble. In the East Indies three crops are gathered annually. The fruit is gathered by hand and is never used whole, on account of its acidity; the outer pulpy coat is removed with a knife, and thrown away, the arillus is then carefully separated, flattened, and dried in the sun, sprinkled with sea-water, and again partially dried; in this process it changes from its original crimson color to a brownish-yellow, and constitutes the mace of commerce. The nuts require more attention, as they are liable to be attacked by insects; they are first exposed to the sun for a few days, and then slowly dried by a slow fire for a length of time, until the seed becomes perfectly detached from the shell; this is then broken and the seeds steeped in a mixture of lime and water, to protect them from insects and prevent the volatilization of their aroma, and thus prepared they constitute the nutmegs of commerce. The kernel of the fruit, or nutmeg, and the arillus of the nut, or mace, are the officinal parts. Nutmegs reach this country from the East Indies, from Europe, and a small portion from the West Indies.

The finer kinds of nutmeg are small, short, of an olive shape, firm, heavy, externally marked with reticulated furrows, and lightish brown or white, from having been dipped for preservation in milk of lime; internally grayish-red, and beautifully marbled with darker brownish-

red veins, from which oil may be easily expressed with the point of a warm knife. They have a strong, peculiar, delightfully fragrant odor, and a powerful, bitter, warm aromatic taste. Their virtues are extracted by alcohol or ether. According to Bonastre, they contain 54 per cent. of lignin, 24 of stearin, 7.6 of elain, 6.0 of volatile oil, 2.4 of starch, 1 of gum, and 0.8 of an acid substance. By distillation with water, the volatile oil may be obtained. The small, round heavy nutmeg is esteemed superior to those which are larger, longer, lighter, less marbled, and not so oleaginous. It makes a grayish-brown, somewhat fatty powder. All inferior nutmegs may be recognized by the above description.

The powder of nutmegs beaten to a pulp with a little water, and pressed between heated plates, yields from ten to thirty per cent. of a fragrant, orange-colored, concrete oil, commonly, but incorrectly called Oil of Mace. It is the *Myristicæ Adeps* of the Edinburgh Pharmacopœia, and the *Myristicæ Oleum* of the London. The best quality of this oil is imported from the East Indies in stone jars; it is in rectangular cakes, enveloped in the leaves of some plant. It has the consistence of suet, and possesses the odor and taste of the nutmeg. It is soluble in four parts of boiling alcohol, which deposits the solid part of the oil, *myristicin*, in silky crystals. The crude fat likewise contains a soft, yellowish or brownish oily substance, soluble in cold alcohol or ether, and a volatile oil. *Myristicin* is insoluble in cold alcohol or ether, melts at 88°, and is a compound of *Myristicic acid* and *glycerin*. An inferior concrete oil is prepared in Holland from spoiled nutmegs. An artificial preparation is made by mixing together various proportions of suet, palm oil, wax, spermaceti, etc., coloring the mixture, and flavoring it with the volatile oil of nutmeg.

Mace is in the shape of a flat membrane irregularly slit, smooth, soft, flexible, of a reddish or orange-yellow color, and an odor and taste closely resembling those of nutmeg. It is seldom used in medicine. It contains a small quantity of volatile oil, a fixed, odorous, yellow oil, soluble in ether, insoluble in boiling alcohol; a fixed, odorous, red oil, soluble in every proportion in alcohol or ether; a peculiar gummy matter, analogous to gum and amidin, constituting one-third of the whole, and a small proportion of ligneous fiber. On distillation, mace affords a volatile oil, and by pressure a fixed oil, less concrete than that of nutmegs. Inferior mace may be known by its brittleness, by its being whitish or pale-yellow, and having but little taste and odor.

Properties and Uses.—Both nutmeg and mace possess aromatic stimulating properties, and are occasionally used to remove flatulency, correct the nausea arising from other drugs and to allay nausea and vomiting. The nutmeg forms a very agreeable addition to various drinks for convalescents, as well as to some articles of diet; it is generally grated over them, or mixed with them. Applied locally, grated

nutmeg mixed with lard has been found an excellent application in piles—and the nutmeg roasted is used in some parts of the country internally, as a domestic remedy for leucorrhœa. I have known the following preparation to cure several cases of intermittent fever, and have been assured of its almost universal success in this disease. It is also recommended for the cure of other forms of fever. Char a nutmeg by holding it in the flame, and permitting it to burn by itself without disturbance; when charred, pulverize it, combine it with an equal quantity of burnt alum, and divide the mixture into three powders. On the commencement of the chill give a powder—if this does not break it, give the second powder on the approach of the next chill, and if not cured, the third powder must be given as the succeeding chill comes on. Usually the first powder effects a cure, and it is seldom that the three powders are required. The bowels should always be acted upon by a purgative previous to their administration. It is certainly deserving attention, though I do not pretend to account for its action. Dose of nutmeg or mace, from five to twenty grains. Larger doses possess narcotic qualities, and in doses of two or three drachms, stupor and delirium have been produced.

Off. Prep.—Tinctura Lavandulæ Composita.

MYROSPERMUM PERUIFERUM.

Balsam of Peru.

Nat. Ord.—Leguminosæ, (*De Candolle*); Amyridaceæ, (*Lindley*). *Sex. Syst.*—Decandria Monogynia.

THE JUICE OF MYROSPERMUM PERUIFERUM.

Description.—This is the *Myroxylon Peruiferum* of Linnæus; it is a large tree, having the trunk and branches covered with a gray, coarse, thick, compact bark, of a pale color internally, and filled with a fragrant resin. The branches are almost horizontal. The leaves are alternate, and composed of two to five pairs of nearly opposite leaflets, which are ovate-lanceolate, acute, coriaceous, somewhat obtuse and emarginate at the apex, smooth, shining above, hairy beneath, entire, with pellucid dots, and on short petioles; many leaves terminate unequally. The flowers spring from the axils of the leaves in long, tomentose, erect racemes, longer than the leaves, with slender peduncles and a small bract at the base of each. The calyx is campanulate, dark-green, nearly equally five-toothed, with the odd tooth remote from the others. The corolla is formed of five white petals, the upper one reflexed, broad, roundish, emarginate, and twice the size of the others; the remaining four distinct, linear-lanceolate, reflexed, spreading. Stamens ten, distinct, spreading, shorter than the petals, with elongate, sulcate, mucronate anthers. The ovary is oblong, pedicellate, with a short, subulate, crooked style, bearing a simple stigma. The fruit is a pendulous,

yellowish legume, somewhat clavate and curved, and terminating by the persistent curved style. It contains a single *seed*, which is crescent-shaped and enveloped in a yellow liquid balsam, which hardens into resin.

History.—Although the above is generally considered to be the tree which yields Balsam of Peru, yet there has been much uncertainty as to the particular species, and even at the present time the question is not satisfactorily determined. It is probable that the balsam is obtained from more than one species of *MyrospERMUM*, as it presents varieties in commerce, that seem to show a difference of origin. The above tree is a native of several parts of South America, and grows in low, warm, sunny situations, especially amidst the Peruvian forests on the banks of the Marañon, flowering from August to October. By the natives it is called *Quinquino*. The tree abounds in a balsamic juice, which flows copiously on an incision being made in the bark, and is collected on rags which are placed in the incisions, and replaced by others, as they become saturated. The rags are then boiled in water, from the top of which the balsam is skimmed off, as it rises, and put into vessels for purification and exportation. It usually comes to this country in tin canisters, with a whitish scum upon its surface, and a deposit which is dissolved by heat.

Balsam of Peru is opaque, of a dark reddish-brown color, syrupy, or of the consistence of molasses, of an agreeable balsamic odor, and an acrid, aromatic, bitterish taste, leaving a prickling sensation in the throat when swallowed. Its specific gravity is about 1.155. On exposure to the air it does not dry up; it burns when exposed to flame, with a white smoke, and diffusing a fragrant odor. It is soluble in a large proportion of alcohol, but only partially in ether; it is miscible with water by means of mucilage. Boiling water removes from it a crystalline acid, supposed by Stolze to be benzoic acid, and by Fremy, cinnamic. Various analyses have been made but none of them are satisfactory. Supposed to contain an oily substance, called Cinnamine, resinous matter, benzoic acid, extractive, moisture, etc.

There is likewise a variety of Peruvian balsam, of a pale-yellowish color, syrupy, highly fragrant, and of a bitterish, acrid, somewhat aromatic taste. It is called White Peruvian Balsam, and is said to be procured from the fruit, by expression. When dried, it constitutes the Dry Peruvian Balsam, or Indian Opobalsamum, and is of a reddish, pulverizable, resinoid character. *Balsamito*, is the name of a tincture of the fruit of the tree in rum, and is said to possess stimulant, diuretic, and anthelmintic properties. The natives of Central America employ it as a wash to remove freckles, and as a local application to indolent or gangrenous ulcers. Neither of these varieties reach the markets of this country.

Properties and Uses.—Balsam of Peru is a stimulating tonic and expectorant, acting more especially on mucous tissues. It has been recommended in chronic catarrh, asthma, pulmonary complaints generally, mucous inflammation of the stomach and bowels, gonorrhea, leucorrhea, gleet, and chronic diarrhea. Externally, it forms an excellent application to indolent ulcers, wounds, ringworm of the scalp, and other cutaneous affections. It may be applied alone, or in ointment made by melting it with an equal part by weight of tallow. The dose is from ten to thirty drops, and is best given diffused in water by means of sugar and the yolk of egg, or gum arabic.

MYROSPERMUM TOLUIFERUM.

Balsam of Tolu.

Nat. Ord.—Leguminosæ. *Sex. Syst.*—Decandria Monogynia.

THE JUICE OF MYROSPERMUM TOLUIFERUM.

Description.—There has been no detailed description given of this tree. It is supposed to resemble the *M. Peruiferum*, differing in its leaflets, which, according to Richard, are thin, membranous, obovate, with a lengthened and pointed apex, and the terminal ones being larger than the others.

History.—As with the preceding article, so with the present, it is involved in considerable obscurity; it being uncertain whether the same trees which yield Balsam of Peru, furnish likewise that of Tolu. Some consider that the two balsams are derived from the same species, and that they differ merely on account of their mode of collection and preparation.

The *M. Toluiferum*, which is undoubtedly one species from which Tolu is obtained, is found in several parts of South America, especially on the elevated plains and mountains near Carthagena, Tolu, and in the Magdalena province of Colombia. The balsam is said to be procured by making incisions into the trunk of the tree, and as it exudes, it is received into vessels of various kinds, in which it concretes. It is brought from Carthagena, contained in calabashes, earthen jars or glass vessels. When first imported, it is usually soft and tenacious, but by age becomes hard and brittle, resembling resin. It is shining, translucent, of a pale yellowish-red or brown color, very fragrant, and a warm, sweetish, pungent, rather agreeable taste. It softens when chewed, and exposed to heat, melts readily; when inflamed it evolves an agreeable odor. It is wholly soluble in alcohol, ether and the volatile oils, and like Balsam of Peru, gives up its acid to boiling water. By distillation with water a small quantity of volatile oil is obtained, and if the heat be continued, its acid sublimes. When dissolved in the smallest quantity of a solution of potassa, it is said to lose its characteristic odor,

and acquire that of the clove-pink. Its chemical composition has not been satisfactorily ascertained, but appears to be similar to that of the Balsam of Peru, differing only in its greater tendency to become resinous. The pure volatile oil, called *Tolene*, is a hydro-carbon ($C_{10} H_8$). Guibourt observes that as the balsam solidifies, it becomes less odorous, and holds more acid; and thinks that the acid is increased at the expense of the oil.

Properties and Uses.—Balsam of Tolu, like that of Peru, is a stimulant tonic and expectorant, and may be used as a substitute for it, in chronic catarrhs, and other pulmonary affections not inflammatory in their character. It is usually preferred on account of its more agreeable flavor, and for which it is often added to expectorant mixtures. The vapor of an ethereal solution of this balsam is said to be beneficial in old and obstinate coughs, when inhaled. Two parts of Tolu, three of almond oil, four of gum arabic, and sixteen of rose-water, make an excellent liniment for excoriated nipples. The dose is from ten to thirty grains, frequently repeated, and given in tincture, syrup, or similar to Balsam of Peru.

Off. Prep.—Mistura Sanguinarie Composita; Syrupus Tolutani; Tinctura Tolutani; Tinctura Benzoini Composita.

MYRTUS PIMENTA.

Pimento.

Nat. Ord.—Myrtaceæ. *Sex. Syst.*—Icosandria Monogynia.

THE UNRIPE BERRIES.

Description.—This tree, the *Eugenia Pimenta* of De Candolle, is a handsome evergreen, with a straight trunk about thirty feet high, much branched toward the top, and covered with a smooth gray bark; the twigs are compressed, the younger and the pedicels downy. The leaves are opposite, on short petioles, oblong-lanceolate, smooth, shining, pointed, deep-green, about four inches long, and when recent abound in an essential oil, and have an aromatic taste. The flowers are small, numerous, and disposed in axillary and terminal panicles upon trichotomous stalks. The calyx is formed of four roundish sepals. The petals are four, reflected, greenish-white. The stamens are numerous, longer than the petals, of the same color, with rounded, white anthers. The style is simple, with an obtuse stigma. The fruit is a smooth, shining, succulent berry, crowned with the persistent calyx, of a black or purplish color when ripe, about the size of a pea, and containing two reniform, flattish seeds.

History.—The Pimento tree is a native of Mexico, the West Indies, and other parts of South America. It is abundant in Jamaica. The tree bears fruit when three years old, and arrives at maturity at seven;

it grows best in a calcareous soil, covered with a light mold. The unripe berries are the officinal part, and are more generally known by the name of *Allspice*. Other names, as *Jamaica Pepper*, *Bayberry*, etc., have been given to them. They are gathered just before they are ripe, and carefully dried in the sun, and then put into bags or casks for exportation. When these trees are in blossom they exhale a most delicious fragrance.

Pimento, or allspice when dried, becomes brownish-black, round, wrinkled, and umbilicate at the apex. It consists of an external, hard, brittle rind, which is yellowish internally, and which presents two cells when broken, each containing a dark-brown hemispherical seed. Its odor is strongly aromatic, combining that of cinnamon, cloves, and nutmeg, and the taste is warm, aromatic, pungent, and slightly astringent. Boiling water takes up the aroma, and alcohol all the active properties. The infusion is brown, and has an acid reaction on litmus paper. The berries are found to contain a volatile oil, which may be obtained by distillation, a green fixed oil, of a burning aromatic taste, a concrete, yellowish, flaky, oleaginous substance, tannin, gum, resin, uncrystallizable sugar, coloring-matter, malic and gallic acids, saline matters, moisture, and lignin. The seeds contain only half the proportion of volatile oil, and three times as much astringent extract.

Properties and Uses.—Pimento is a warm aromatic stimulant and carminative, and may be used where such agents are indicated. It is seldom employed in medicine, but is used largely as a hot aromatic in cookery; and sometimes it is added to other medicines to render them more agreeable. A tincture has been recommended as a local application in chilblains. Dose of the powder, from ten to thirty grains; of the tincture, from one to two fluidrachms; of the oil, from two to five drops.

Off. Prep.—Aqua Pimentæ; Tinctura Guaiaci Ammoniata.

NABALUS ALBUS.

Lion's Foot.

Nat. Ord.—Compositæ, Tribe Cichoraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE PLANT.

Description.—This plant, also known as *White-Lettuce*, and *Rattlesnake Root*, is the *Prenanthes Albus* of Linnæus. It is an indigenous perennial herb, with a smooth, somewhat glaucous stem, corymbose-paniculate at the summit, stout, purplish, often deeply so in spots, and from two to four feet in height. The radical leaves are angular-hastate, often more or less deeply three to five-lobed; the uppermost cauline ones, lanceolate, and between these the intermediate forms, hastate and ovate,

petiolate, and all irregularly dentate. *Heads* pendulous, glabrous; *involucre* of eight linear scales, nine to twelve-flowered; *scales* purplish; *corollas* whitish. *Pappus* brown.

There is a variety of the above plant, *Nabalus Serpentaria* or *Prenanthes Serpentaria*, with rough dentate leaves, of which the *radical* are palmate, the *cauline* with long footstalks, sinuate-pinnatifid, disposed to be three-lobed, with the middle lobe three-parted and the *upper*, lanceolate. The *racemes* are terminal, somewhat paniced, short, and nodding, with an eight-cleft calyx, and twelve florets; it is about two feet high, with purple flowers.

History.—This plant is found in moist woods and shades, in rich soils, from New England to Iowa, and from Canada to Carolina, flowering in August. The variety *N. Serpentaria* is common to the mountainous districts of Virginia, North Carolina, and other sections of the United States, and is considered more active than the *N. Albus*. The root, leaves, and juice of the plant are employed. It has not been analyzed.

Properties and Uses.—Said to be an antidote to the bite of the rattlesnake, and other poisonous serpents. The milky juice of the plant is taken internally; while the leaves steeped in water are to be applied to the wound, and frequently changed. A decoction of the root, which is bitter, has been successfully used in the bite of the rattlesnake, also in dysentery. This plant is deserving further and more accurate investigation.

NECTANDRA RODIÆI.

Bebeeru.

Nat. Ord.—Lauraceæ. *Sex. Syst.*—Dodecandria Monogynia.

THE ALKALOID CONTAINED IN THE BARK.

Description.—This is a magnificent forest tree, growing from sixty to eighty feet in height, branching near the summit, and covered with a smooth ash-gray bark. The *leaves* are nearly opposite, smooth, shining, coriaceous, five or six inches long, and two or three broad. The *flowers* are obscure, whitish-yellow, cordate, and disposed in axillary panicles. The *fruit* is a globular berry, about six inches in circumference, having a woody, grayish-brown, speckled pericarp, and a seed with two large plano-convex cotyledons, which is yellow when freshly cut, and possesses an acid reaction and an intensely bitter taste. The fruit abounds in bitter starch.

History.—This tree is a native of British Guiana, and its bark has been recently brought into notice by Dr. Rodie, as a powerful tonic and febrifuge. It is in flat pieces of one or two feet in length, from two to six inches broad, and about four lines in thickness, hard, heavy, brittle, with a rough fibrous fracture, dark-cinnamon-brown and rather smooth

internally, and covered externally with a brittle grayish-brown epidermis. It has little or no odor, but a strong persistent bitter taste, with considerable astringency. The fruit is as large as a small apple, obovate, or obcordate, somewhat compressed, consisting of an external brittle shell, and an interior fleshy kernel. It is likewise intensely bitter. The Sulphate of Bebeerina is obtained from the bark and seeds. The process for obtaining it is essentially the same as that for sulphate of quinia. The bark is at first freed of tannin and coloring matter by boiling it with carbonate of soda; it is then exhausted by boiling in water acidulated with sulphuric acid, and the alkaline matter is thrown down from the concentrated acid liquor by means of carbonate of soda. The impure bases thus separated are washed, dissolved, and neutralized with weak sulphuric acid, and the solution is treated with animal charcoal, concentrated, filtered again, and finally evaporated in thin layers in flat vessels. Any excess of acid must be carefully avoided, otherwise the salt will be charred on evaporating it to dryness.

The sulphate of bebeerina of the shops, contains both bebeerina and Sipeerina, another alkaline principle also discovered by Dr. Rodie. It occurs in thin, somewhat glittering scales of a brownish-yellow color, (sometimes with a greenish tinge,) and forming a yellow powder. It is inodorous and has an intensely bitter, persistent, and somewhat astringent taste. Like the Sulphate of Quinia it requires an excess of acid for its perfect solution; hence the addition of a few drops of diluted sulphuric acid renders its solution more complete. It is also soluble in spirit. When well prepared, the scale-like particles should be glittering and translucent, and ought, when incinerated to leave no ash, or a mere trace only. In this way, sulphate of lime, the only important impurity which has been found in it, may be easily detected. When carefully dried, it contains 90.83 per cent. of base, and 9.17 of sulphuric acid.

Pure Bebeerina may be obtained as follows: Decompose the commercial sulphate by ammonia, and carefully wash the alkaline precipitate with cold water, and while still moist, triturate it with an equal weight of freshly precipitated and moist hydrated oxide of lead. The magma thus formed is then dried over the water-bath, and the alkali is taken up by absolute alcohol. On distilling off the spirit, the organic base is left in the form of a transparent orange-yellow resinous mass, containing Sipeerina. This is dried, pulverized, and treated with successive portions of pure ether, which dissolves the bebeerina, leaving the sipeerina behind. The ether is distilled and evaporated, and pure bebeerina is obtained in the form of a translucent, amorphous, but homogeneous resinous-looking substance, of a pale-yellow color, and possessed of all the properties of an organic alkali. Bebeerina does not crystallize; it is very soluble in alcohol, less so in ether, and very sparingly in water. When heated it fuses; and the heat being continued, it swells up, giving off vapors of a strong peculiar odor and burns without residue. It forms

non-crystallizable salts with acids. With bichromate of potassa and sulphuric acid it gives a black resin, and a yellow, with nitric acid.

M. A. De Planta, has still further purified Bebeerina, and obtained it in a colorless powder, inodorous, unalterable in the air, highly electric, very soluble in water, but dissolving more easily in ether, and in all proportions in alcohol. He takes the bebeerina obtained by the above process of MacLagan and Tilley, and treats it with acetic acid, which imperfectly dissolves it; to the filtered liquor he adds an excess of acetate of lead, and then potassa, until a precipitate is formed. The combination of bebeerina and oxide of lead, which is thus obtained, is dried in a water-bath, and exhausted with ether. On distilling away the ether, after filtering, the bebeerina is left in the form of a syrupy mass, having a slightly yellow color. It is dissolved in absolute alcohol, and the solution in a concentrated state, added drop by drop, to cold water kept constantly agitated. It forms a thick precipitate, which may be collected on a filter, washed and dried without agglutinating.

Properties and Uses.—Bebeerina and its sulphate, is a tonic and anti-periodic, and is applicable to the same forms of disease as those in which quinia is employed. It increases the appetite, raises the pulse a little, and improves the tone of the constitution generally, with but little tendency to produce ringing in the ears, headache, vertigo, or other nervous symptoms, as is the case with quinia, except when given in large or frequently repeated doses. It has been used with success in intermittent and remittent fevers, but is inferior to quinia, although a valuable substitute for it. It has been found of decided benefit in periodic headache, and other periodic neuralgias, as well as in atonic dyspepsia, and general debility. It seems to be specially applicable to persons of a strumous or phthisical habit, and in the latter stages of phthisis has strengthened the system, improved the appetite, and checked night-sweats. In strumous ophthalmia, and in pregnancy requiring tonic treatment, it has been highly prized by many practitioners. The dose of Sulphate of Bebeerina is from one to three grains as a tonic, and from five to twenty as a febrifuge. It may be given in pill with conserve of roses, or in solution. Half a drachm of the sulphate, twenty-five minims of elixir vitriol, a fluidounce each, of syrup, and tincture of orange peel, and four fluidounces of water, mixed together, form an excellent solution for general tonic purposes; of this a tablespoonful may be given three times a day, each dose containing about two and a half grains of the salt.

NEPETA CATARIA.

Catnip.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE TOPS AND LEAVES.

Description.—*Catnip* or *Catmint* is a perennial herbaceous plant, with an erect, quadrangular, branching, hoary-tomentose *stem* from one to three feet in height. The *leaves* are opposite, petiolate, cordate, pubescent, coarsely crenate-serrate, green above, and whitish beneath. The *flowers* are many, white or purplish, the lower lip dotted with crimson, and are disposed in whorled spikes, which are slightly pedunculated. *Calyx* dry, striate, tubular, obliquely five-toothed. *Corolla* naked and dilated in the throat, two lipped, twice the length of the calyx; the upper lip rather concave, erect, notched or two-cleft; the lower spreading, three-cleft, the middle lobe largest and crenate. *Stamens* four, ascending under the upper lip; *anthers* approximate in pairs, the cells divergent.

History.—Catnip is a native of Europe, and is abundantly naturalized in this country; it is found growing in dry, neglected situations, about old buildings and fences, and in cultivated grounds, flowering from June to September. The tops and leaves are officinal, they have a strong, peculiar, rather unpleasant odor, and a bitter, somewhat aromatic taste, yielding the active virtues to boiling water. The names of this plant, in all languages, indicate the fondness of cats for it, upon whom it is said to exert an aphrodisiac influence. Its active constituents are volatile oil, and that variety of tannin which produces a greenish color with the salts of iron.

Properties and Uses.—Catnip is diaphoretic and carminative in warm infusion; tonic, when cold. It is also antispasmodic, emmenagogue, and diuretic. In warm infusion it is used in febrile diseases as a diaphoretic, and to promote the action of other diaphoretics, as well as to allay spasmodic action and produce sleep; it is also given as a carminative and antispasmodic in the flatulent colic of children; and as an emmenagogue or uterine tonic, it has proved decidedly beneficial in amenorrhea and dysmenorrhea, and has likewise been successfully employed in nervous headache, hysteria, and nervous irritability. The leaves chewed, or held in contact with the diseased tooth, are said to relieve toothache. A warm infusion of saffron and catnip is a very popular and beneficial remedy in colds, febrile and exanthematous diseases to which infants and young children are subject. A fluid extract of catnip, valerian, and scullcap, forms an excellent agent for the cure of nervous headache, restlessness, and many other nervous symptoms. The expressed juice of the herb, given in doses of a tablespoonful two or three times a day, is decidedly a superior remedy in amenorrhea, often restoring the menstrual secretion after other means have failed. The leaves are frequently used in fomentation as a local application to painful and

inflammatory affections. Of the dried leaves in powder, two drachms may be given for a dose in some liquid, as cold or warm water; the infusion, made by adding an ounce of the dried herb to a pint of boiling water, covering it, and allowing it to stand for a few minutes, may be drank as freely as the stomach will permit.

Off. Prep.—Infusum Nepetæ.

NEPETA GLECHOMA.

Ground Ivy.

Nat. Ord.—Labiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE LEAVES.

Description.—This plant, the *Glechoma Hederacea* of Linnæus, is a perennial gray, hairy herb, with a prostrate, creeping stem, radicating at base, square, and varying in length from a few inches to one or two feet. The leaves are petiolate, opposite, roundish, cordate-reniform, crenate, hairy, and glaucous on both sides; floral leaves of the same form. The flowers are bluish-purple, about three together in axillary whorls. The corolla is about three times as long as the calyx, with a variegated throat. Calyx long, curved, villous, with the limb oblique, and the teeth lanceolate-subulate, the upper being the largest. Bracts scarcely so long as the pedicel. The two anthers of each pair of stamens meet with their two divaricate cells, forming the appearance of a cross.

History.—This plant is indigenous in Europe and the United States, where it is found growing in shady, grassy places, in orchards, along fences and hedges, and on the sides of moist meadows, flowering in May and August. The leaves are the parts used, and yield their virtues, by infusion, to boiling water. They have a disagreeable odor, and a rough, bitterish, somewhat aromatic taste. It is also called *Gill-over-the-ground*.

Properties and Uses.—Ground Ivy is stimulant, tonic, and pectoral, and has been recommended in diseases of the lungs, and kidneys, asthma, jaundice, hypochondria, and monomania. An infusion of the leaves is highly recommended in lead colic, and it is stated that painters who make use of it often are never troubled with that affection. The fresh juice snuffed up the nose, is said to cure the most inveterate headache. Dose of the powdered leaves, from half a drachm to a drachm; of the infusion one or two fluidounces.

NICOTIANA TABACUM.

Tobacco.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES.

Description.—Tobacco is an annual plant, with a large fibrous root, and an erect, round, hairy, viscid stem branched toward the top, and

from three to five feet in height. The *leaves* are numerous, alternate, sessile, large, ovate or lanceolate, acuminate, entire, viscid, pubescent, and of a pale-green color. The lower cauline leaves are somewhat decurrent, often two feet long, and four inches broad, and diminish in size as they approach the top. The *flowers* are rose-colored, and disposed in loose terminal panicles, upon long footstalks, and are furnished with long, linear, acute bracts at the divisions of the peduncle. The *calyx* is urceolate, hairy, somewhat viscid, half as long as the corolla, and divided at its summit into five acute segments. The *corolla* is funnel-shaped, monopetalous, viscid, of a pale-greenish color externally, swelling above into an oblong cup, which expands into five pointed, plaited, rose-colored segments. The *stamens* are as long as the corolla, inclining to one side, and supporting oblong, compressed anthers. The *ovary* is ovate, and bears a long, slender style, terminated by a roundish, bilobate stigma. The *fruit* is an ovate, two-valved, two-celled capsule, invested with the calyx, opening crosswise at top, loculicidal, and containing numerous, small, reniform seeds, attached to a fleshy receptacle.

History.—This plant is a native of the warm parts of America, and was unknown to Europeans before the discovery of this country. At present it is cultivated in most parts of the world, and especially in the Middle States of this country. Havanna tobacco is most esteemed by the smoker, but the Virginian is the strongest, and in most common use. It flowers in July. In cultivating tobacco, the young shoots, produced from seeds thickly sown in beds, are transplanted into the fields during the month of May, and set in rows with an interval of three or four feet between the plants. The crop requires constant attention through the whole period of its growth. The development of the leaves is promoted by removing the top of each plant, and thus preventing it from running into flower and seed. The harvest is in August. The ripe plants having been cut off above their roots, are dried under cover, then stripped of their leaves, which are tied in bundles, and packed into hogsheads. There are several varieties of this species, but they do not differ materially in properties. Soil and mode of cultivation, affects the quality of tobacco.

As found in commerce, tobacco is of various shades of color, most commonly dark yellowish-brown, of a strong, peculiar, heavy, narcotic odor, and a strong, bitter, nauseous taste, followed by a very unpleasant, acrid sensation in the throat. The darker the color of the tobacco, the stronger is the tobacco, and the greater its action on the system. Its properties are imparted to boiling water or alcohol. Long boiling renders it feeble or inert. Many chemists have analyzed it, and with various results. Posselt and Reimann, found ten thousand parts of the fresh leaves to contain 1172 of solid matter; of which 287 are bitter extractive, 174 gum mixed with a little malate of lime, 27 green-resin, 26 albumen, 105 amylaceous gluten, 133 organic and inorganic salts, 497

ligneous fiber, 6 a peculiar, oily-like alkaloid called *Nicotina*, and 1 a camphoraceous volatile oil termed *Nicotianin*. According to M. E. Goupet, tobacco also contains a little citric acid.

Nicotia or *Nicotina* exists in tobacco combined with an acid in excess, and in this state is not volatile. That obtained by Vauquelin, and Pos-selt and Reimann was not in a state of purity; it was reserved for MM. Henry and Boutron to prepare the pure alkaloid by the following process: Five hundred parts of smoking tobacco were exposed to distillation in connection with about six thousand parts of water, and two hundred parts of caustic soda; the heat applied being at first very moderate, and afterward increased to the boiling point. The product of the distillation was received in a vessel containing about thirty or forty parts of sulphuric acid, diluted with three times its weight of water; and the process was continued till nearly one-half of the liquid had come over. The product, in which care was taken to preserve a slight excess of acid, was evaporated to about one hundred parts, and was then allowed to cool. A slight deposit which had formed was separated by filtration, an excess of caustic soda was added, and the liquid again distilled. A colorless, very volatile acrid liquid now came over, which, being concentrated under the receiver of an air-pump, lost the ammonia which accompanied it, and assumed a syrupy consistence, and more or less of the color of amber. In this liquid, after a few days, minute crystalline plates of pure nicotia formed, but in consequence of their great affinity for moisture, it was difficult to isolate them.

As usually obtained *Nicotia* is in the form of an oleaginous, transparent, colorless, tolerably fluid, anhydrous liquid, of the density of 1.048, becoming slightly yellow with keeping, and tending to become brown and thick from contact with the air, from which it absorbs oxygen; it remains liquid at 22° F., and volatilizes at 77°, leaving a carbonaceous residue. When cold it has but little odor; its taste is exceedingly acrid-burning, even when largely diluted. The vapor which rises from its volatilization, presents such a powerful smell of tobacco, and is so irritating, that it is difficult to breathe in a room in which one drop of it has been spilt; if this vapor be approached with a lighted taper, it burns with a white smoky flame, and leaves a carbonaceous residue. It strongly blues reddened litmus paper; and is soluble in water, alcohol, oil of turpentine and fat oils, also in ether, which easily separates it from an aqueous solution. It combines directly with acids, disengaging heat, and forming difficultly crystallizable salts, of a deliquescent character, having an acrid-burning taste, and losing a portion of their base by heat; the double salts which it yields with the different metallic oxides crystallize better. Heated with stearic acid it dissolves and forms a soap, which congeals on cooling, and is slightly soluble in water, and very soluble in heated ether. It contains a larger proportion of nitrogen than most other organic alkalies; its formula being $N_2 C_{20} H_{14}$, and its combining

number 162. It is the active constituent of tobacco, and is a most virulent poison. One drop of its concentrated solution is sufficient to kill a dog; and small birds perished at the approach of a tube containing it. It exists in various proportions in different tobaccos, varying from 3.8 to 11.28 parts in 1000. Smokers in respiring the smoke of tobacco introduce into their bodies a certain quantity of the vapor of nicotia; and the empyreumatic oil of tobacco, formed in the pipe of the smoker, is an active poison, and consists of nicotia attached to a true volatile oil. Tannic acid forms with nicotia a compound of but slight solubility, and might be employed as an antidote to it.

Nicotianin, discovered by Hermstadt, may be obtained by distilling six pounds of fresh tobacco leaves with twelve pounds of water, till one-half of the liquid passes over, then add six pounds more of water, and again distil, and repeat this process three times. The nicotianin will float on the surface of the water, amounting to about eleven grains. It is a white, fatty, crystalline substance, with the odor of tobacco, and its bitterish, warm taste, without its acridity. It is volatilizable by heat, insoluble in water, soluble in alcohol or ether, not affected by the dilute acids, but dissolved by solution of potassa. When applied to the nostrils it occasions sneezing, and a grain of it swallowed produces giddiness and nausea.

The *empyreumatic oil of tobacco* is also a virulent poison, it is of a dark-brown color, with a peculiar odor and an acrid taste, and may be obtained from the pipe of a smoker, or by distillation of tobacco by a heat above 212° . One drop killed a cat, and two drops a dog, in about five minutes, each, being injected into the rectum.

Properties and Uses.—Tobacco is a potent acro-narcotic poison. The infusion is more apt to affect the heart, and its smoke to act on the brain—the former being followed by great feebleness of the pulse, fluttering of the heart, faintness, alarm, etc., while the latter occasions nausea and vomiting followed by drowsiness. Medicinally it is a sedative, emetic, diuretic, expectorant, discutient, antispasmodic, errhine, and sialagogue. Seldom used internally, except in cases where from extreme insensibility of the stomach, ordinary emetics will not operate. The smoke injected into the rectum, or the leaf itself in the shape of a suppository, and introduced into the rectum, has been beneficial in strangulated hernia, obstinate constipation from spasm of the bowels, in retention of urine from spasmodic urethral stricture, hysteric convulsions, worms, and in spasms caused by lead; likewise in croup, asthma, and in inflammation of peritoneum to produce evacuations of the bowels, moderating reaction, and dispelling tympanitis. To use the infusion of smoke, blow the smoke into milk or water and inject.

In croup and spasm of the rima glottidis a plaster made of Scotch snuff and lard, and applied to the throat and breast, has proved very

effectual ; or a cataplasm of the leaves may be employed. An ointment of tobacco has been found valuable in several forms of cutaneous disease. The leaves, in combination with belladonna or stramonium leaves, will be found an excellent application to old, obstinate ulcers, painful tumors, and for spasmodic affections. Almost a certain cure for piles, is the application of a wet leaf to the parts, and maintained there for three or four hours. The inspissated juice has cured facial neuralgia, being rubbed along the track of the affected nerve. In using tobacco at all, great caution should always be observed, and if it produce great depression, or too lasting a sedative effect, stimulants, as ammonia or brandy, should be administered. The quantity for an injection ought not to exceed a scruple at first ; if this fails, cautiously increase it, for even half a drachm has often proved fatal ; if the injection do not come away in five minutes, it should be assisted by throwing up a large quantity of warm water. Tobacco ought never to be used internally, as we have other agents, much safer and fully as effectual, to meet every indication desired.

Off. Prep.—Infusum Tabaci ; Oleum Tabaci ; Unguentum Tabaci.

NYMPHÆA ODORATA.

White Pond Lily.

Nat. Ord.—Nymphæaceæ. *Sex. Syst.*—Polyandria Monogynia.

THE ROOT.

Description.—White Pond Lily has a blackish, large, fleshy, perennial root, or *rhizoma*, growing in mud where the water is from three to ten feet in depth, and is often as thick as a man's arm, sending up leaves and flowers to the surface. The *petioles* are long, somewhat semicircular, and perforated throughout by long tubes or air-vessels which serve to float them. The *leaves* are floating, orbicular, sometimes almost kidney-shaped, peltate, cordate-cleft at the base quite to the insertion of the petiole, the lobes on each side prolonged into an acute point, entire, reddish with prominent veins beneath, dark shining-green above, and five or six inches in diameter. The *flowers* are large, white or rose-colored, and fragrant. The *sepals* are four, lanceolate, green without and white within. The *petals* are numerous, lanceolate, from an inch to two and a half inches long, of the most delicate texture, white, sometimes tinged with purple on the outside. *Stamens* numerous, yellow, in several rows ; *filaments* dilated gradually from the inner to the outer series so as to pass insensibly into petals. *Anthers* in two longitudinal cells growing to the filaments, and opening inwardly. *Stigma* with from twelve to twenty-four rays, very much resembling abortive anthers, at first incurved, afterward spreading. The *pericarp* is berry-like, many-celled, many-seeded.

History.—This plant grows in ponds, marshes, and sluggish streams in most parts of the United States, flowering from June to September; the flowers shut at night and open about sunrise; and the seeds ripen under water. The root is the officinal part, and becomes light, spongy and friable on drying. It has an astringent and bitter taste, and readily imparts its virtues to water. It is said to contain much tannin and gallic acid, with starch, mucilage, resin, sugar, ammonia, ulmine, tartaric acid, fecula, etc. The root should be collected in the fall, freed from dirt, cut into slices and carefully dried.

Properties and Uses.—The root is astringent, demulcent, anodyne and anti-scorfulous. Used in dysentery, diarrhea, gonorrhea, leucorrhea, and scrofula, and combined with wild cherry in bronchial affections. Externally, the leaves and roots have been used in form of poultice to boils, tumors, scrofulous ulcers, and inflamed skin. In infusion, used as a gargle in ulcers of mouth and throat, and as an injection in leucorrhea. I recollect a lady, who, several years since, was pronounced by several physicians to have uterine cancer, and which resisted all their treatment; she was permanently cured by a squaw who gave her to drink freely of the decoction of a root, as well as to inject it in the vagina, which proved to be that of the White Pond Lily. The dose of the powdered root is half a drachm in milk or sweetened water; but its best form of administration is the infusion made by macerating for thirty minutes, one ounce of the coarsely-powdered root in a pint of boiling water, of which from two to four fluidounces may be given three or four times a day.

The Yellow Pond Lily, *Nuphar Advena*, called also *Spatterdock*, *Frog-lily*, etc., possesses similar properties, and may be used as a substitute. It has a large and extensively creeping rhizoma, with large erect leaves, or floating on half-cylindrical petioles, oval, rounded at apex, with rounded, diverging lobes at base, dark shining-green above, and when floating, pale and slimy beneath. The flowers are rather large, globular, erect, yellow, on a thick, rigid stalk. Sepals six, the three outer yellow inside, the three inner entirely yellow. Petals numerous, small, yellow, furrowed externally, and inserted with the stamens on the torus. Stamens numerous, truncated, linear. Stigma, sessile, discoid, with prominent rays. Fruit an ovoid, naked pericarp, many-celled, and many-seeded. It is a very common plant in ponds, ditches, muddy lakes, and mostly in shallow water.

Off. Prep.—Cataplasma Nymphæ; Infusum Nymphæ.

CENANTHE PHELLANDRIUM. (*Phellandrium Aquaticum*.)

Water Fennel.

Nat. Ord.—Apiaceæ. Sex. Syst.—Pentandria Digynia.

THE SEEDS.

Description.—This plant, also known by the names of *Water-Dropwort*, *Fine-leaved Water-hemlock*, is a biennial or perennial, umbelliferous herb, having a thick, spindle-shaped root, with many whorled fibers. The stem is hollow, furrowed, half immersed in the water, very bushy, with numerous spreading, leafy branches, and from two to four feet in height. The leaves are petioled, spreading, repeatedly pinnate, cut, with innumerable fine, expanded, dark-green, shining, acute segments. The umbels are opposite to the leaves, on shortish stalks, about five-rayed, without any general bracts. Partial umbels are very dense, of numerous short rays, accompanied by many narrow, taper-pointed bracts. The flowers are white, numerous, all fertile, the outer ones largest and most irregular; the innermost more certainly prolific. Styles long, filiform, spreading, capitate. Fruit ovate, rather compressed, purplish, smooth, oblong, crowned with the minute spreading calyx, and rather short, permanent, slightly-spreading styles; the dorsal ridges distinct, but little elevated. the lateral ones much broader and thicker; all confluent below the calyx. Pedicels shorter than the fruit.

History.—This plant is common to Europe, growing in ditches and wet places, and its leaves are said to be injurious to cattle, producing a kind of paralysis when eaten. It is poisonous but not so dangerously as the *Cenanthe Crocata*, Dead-tongue, or Hemlock-dropwort, which is considered the most energetic poison of the narcotico-acrid Apiaceæ. By drying, they lose much of their deleterious properties. The *C. Phellandrium* is occasionally found in this country. The seeds are the parts used; they are from a line to a line and a half in length, ovate-oblong, or elliptical, yellowish-green, slightly curved, flat on one side and gibbous on the other, marked with ten delicate ribs, and crowned with the remains of the calyx, and with the erect or reverted styles. They have a peculiar, strong odor, somewhat resembling *angelica*, and an acrid, aromatic taste, owing to a volatile oil, which they contain in abundance. The poisonous principle of this plant has been discovered by M. Hulet, an apothecary at Lyons. He names it *Phellandrine*, and procures it from the seeds, which contain an average of two or three per cent. of it. Seven and a half grains of it, injected into the veins of a dog produced, in a few moments, a difficulty of respiration, nervous tremblings, and anxiety, lasting some hours; he recovered, however. Two birds into whose beaks the same dose was introduced, died in fifteen or twenty minutes. We are not informed of its method of preparation.

Properties and Uses.—Water Fennel is a mild narcotic stimulant, expectorant, alterative, and diuretic. In overdoses it produces vertigo, intoxication, and dull pains in the head. The seeds have been most successfully used in chronic bronchitis, asthma, chronic catarrh, hemoptysis, dyspepsia, and obstinate ulcers. They are given in powder, commencing with five or six grains, and so repeated as to amount to a drachm in twenty-four hours. The formula recommended by Dr. Lobstein, who had considerable success with the remedy, in many of the above named diseases, is: take of powdered water fennel seed, two drachms, lactin, powdered gum arabic, of each, four drachms. Mix, and divide into twenty-four powders. Dose, one powder every two or three hours.

CENOTHERA BIENNIS.

Tree Primrose.

Nat. Ord.—Onagraceæ. *Sex. Syst.*—Octandria Monogynia.

THE BARK AND TWIGS.

Description.—This is an indigenous, biennial plant, with an erect, rough, hairy, and branching stem, from three to five feet high. The leaves are ovate-lanceolate, alternate, acute, obscurely toothed, roughly pubescent, from three to six inches long by half an inch to an inch and a half broad, those on the stem sessile, and the radicals tapering into a petiole. The flowers are numerous, pale-yellow, sessile, odorless, and are disposed in a terminal, somewhat leafy spike; they are nocturnal, open but once by night, and continue only a single day. The calyx tube is two or three times longer than the ovary, deciduous, four lobes, reflexed. The petals are four, equal, obcordate, or obovate, inserted into the top of the tube. Stamens eight, obliquely declined, a little shorter than the petals. Anthers mostly linear. Ovary sessile, four-grooved. Capsule oblong, somewhat tapering above, four-celled, four-valved, valves one-ribbed. Seeds numerous, naked, arranged in two rows in each cell.

History.—Tree-Primrose is very common in this country, growing in fields and waste places, and along fences, from Canada to Carolina; it bears fine yellow flowers in July and August. It is exceedingly variable, and has been divided into numerous species. When it grows in secluded situations, the leaves become covered with a white mucus, giving them a highly pubescent appearance; and by cultivation the flowers become of a much deeper color, and of a larger size. They expand in the evening, just as twilight begins, and continue open till the sun begins to exert some power on the succeeding morning; the same flower does not expand a second time. Pursh states that he has “frequently observed a singularity in this plant, and it might be interesting to make further inquiry into its cause; it is that in a dark night, when no objects can be distinguished at an inconsiderable distance, this

plant, when in full flower, can be seen at a great distance, having a bright white appearance, which probably may arise from some phosphoric properties of the flowers." The bark, leaves, and twigs are the parts used; when recent they are mucilaginous, and when chewed, are followed by a sensation of acidity, which is partially lost by drying.

Properties and Uses.—A strong decoction has been very beneficial in obstinate infantile eruptions, tetter, and some other cutaneous affections. Probably an ointment made by boiling the twigs, leaves and bark, in lard or tallow, would answer a similar purpose. They must be gathered about the flowering season. In fomentation, or when recent, bruised, they form an excellent emollient in ulcers.

OLEA.

Oils.

Oils may be liquid or solid; they are characterized by an unctuous feel, by their inflammability, and insolubility in water, and by their property of leaving a greasy stain upon paper. They are divided into two classes, the *fixed* and *volatile* or *essential* oils.

Olea Fixa, fixed or expressed oils, are usually obtained by submitting the seeds or other bodies containing them, to powerful pressure, after having bruised and gently heated them, in order that the oil may flow more freely. Sometimes the articles are boiled in water, and the oil removed as it comes to the surface. Fixed oils vary in consistence from that of tallow to perfect fluidity; they are somewhat viscid, transparent, and mostly of a yellowish color, which may be removed by animal charcoal; they are most commonly fluid at ordinary temperatures, and are not volatilizable without decomposition. Their density is less than that of water, ranging from 0.913 to 0.936, and their point of concretion varies considerably. Pure fixed oils are nearly inodorous and tasteless. Heated to 600°, ebullition ensues, and a vapor is given off, which when condensed presents oleic and margaric acids in large proportion, beside benzoic acid, another volatile acid, and an empyreumatic oil. If placed in close vessels, and exposed to red heat, they yield among other products, a quantity of the combustible compounds of carbon and hydrogen. In the open air, exposed to heat, they burn with a bright flame, producing water and carbonic acid. They absorb oxygen and gradually become solid on exposure to the air. Those which are thus converted into a transparent, yellowish, flexible solid, without any unctuous feel, are called *Drying oils*. Those which contain mucilage or acid, become rancid, with an unpleasant smell and sharp taste; in those where there is a tendency to the formation of an acid, this change may be prevented by boiling them for a short time with hydrate of magnesia and water. The fixed oils are insoluble in water, but may be mixed with it by means of mucilage, forming emulsions; generally sparingly

soluble in alcohol, but readily so by ether, which may be used to separate them from other vegetable proximate principles. Aided by heat they dissolve sulphur and phosphorus. They convert chlorine and iodine into muriatic and hydriodic acids, which, reacting upon them, render them more and more consistent, until they acquire the firmness of wax. They are decomposed by the stronger acids, furnishing, among other products, oleic and margaric acids. When boiled with nitric acid, they furnish malic and oxalic acids. By combination with salifiable bases, they are resolved into glycerin, which remains free, and into oleic and margaric acids which combine with the base. The compounds of these acids with potassa and soda are called soaps. Many of the vegetable alkalies, resins, volatile oils, and other proximate principles of plants are dissolved by the fixed oils. They consist of two distinct substances, the one a fluid, called *Olein*, and the other a solid, called *Margarin*. Boiling alcohol takes up fixed oil, and on cooling deposits the concrete principle, and the olein may be had by evaporation. Or the olein may be had from congealed oil or fat, by pressing it between folds of bibulous paper, which absorbs the olein, and leaves the solid principle untouched. Margarin differs from Stearin by yielding margaric acid, while the latter furnishes stearic acid. They may be distinguished from each other by the greater fusibility of margarin, and by its solubility in cold ether; and the two principles may be separated by boiling ether, which dissolves both, but deposits the stearin on cooling, and after filtration, yields the margarin by evaporation. Nitric acid converts olein into a deep-yellow butyraceous mass, which when treated with warm alcohol, yields to it in solution a deep orange-red oil, leaving a peculiar fatty matter behind, called *Elaidin*. It is white, fusible at 97°, insoluble in water, sparingly soluble in alcohol, readily soluble in ether, and converted, in the process of saponification by alkalies, into a peculiar acid, termed *Elaidic acid*, and into glycerin. MM. Pelouze and Boudet, consider margarin and stearin to be always identical from whatever source they may be derived, when in a state of purity. The variable fusibility of these principles is owing to the existence of definite combinations of them respectively with olein. They also state that there are two distinct kinds of olein, one existing in the drying oils, and the other in oils which are not drying. One remains liquid under nitrous acid, while the other forms elaidin, with it; the former contains much less hydrogen than the latter. The oleic acid prepared from them, likewise differs as with the one nitrous acid converts it into elaidic acid, but not with the other. Olein, margarin, stearin, elaidin, etc., are at present supposed to be compounds of oleic, margaric, stearic, elaidic, etc., acids, with glycerin; and in the process of saponification, the alkali takes the oily acid, and sets the glycerin free. The ultimate constituents of the fixed oils are carbon, hydrogen, and oxygen; the hydrogen being in much larger proportion than is necessary to form water with the oxygen.

Those which contain the most carbon and least oxygen are least fusible; and their solubility in alcohol is said to depend upon their amount of oxygen, those with the greatest proportion of it, being the most soluble. It is said that some of them contain a very minute proportion of nitrogen, but this is, probably, an error in analysis, the nitrogen depending upon a minute quantity of albuminous matter in the oil, or, perhaps the absorption of a minute quantity of azote from the atmosphere.

Olea Volatilia, volatile or essential oils, are found in all odoriferous plants, in one or several parts of them, or in the whole plant, and are usually obtained by distillation, with a few exceptions, as with the rind of the lemon or orange, where the oil is in distinct cellules, and is obtained by expression. Some oils, as those of mustard, or bitter almonds do not exist ready formed in the plant, but are produced during distillation by chemical reactions and influences. Volatile oils are of various colors, red, green, blue, or brown, sometimes colorless, but more commonly yellowish. Their odor is similar to that of the plants furnishing them, but stronger and less agreeable; and their taste is hot and pungent, being more grateful when they are diluted. They vary in density from 0.847 to 1.17. At ordinary temperatures they partially rise in vapor, diffusing their peculiar odor, and on the application of heat they become entirely volatilized. Their boiling point varies, though most of them rise readily with the vapor of boiling water; when distilled alone, they almost always undergo decomposition. Their point of concretion also varies, some becoming solid at ordinary temperatures, several at 32° F., and many remain liquid even below this degree of temperature. They burn with a bright flame with much smoke; and exposed to the atmosphere, they absorb oxygen, become darker colored, thicker, less fragrant, and finally become converted into resin; under the influence of light this change takes place rapidly. Previous to a complete change, the remaining oil may be recovered by distillation. Instead of resin, some of them form acids by combination with oxygen. Dr. J. L. Plummer has found many of the essential oils to possess bleaching or decolorizing properties; whether this is actually the case is not yet satisfactorily ascertained, as it is probable that the bleaching power was due to some principles produced by the influence of light and air. Faraday has stated that "essential oils are thickened by long exposure to light and air; they become *ozonized*, and their properties changed." The volatile oils are slightly soluble in water, rendering it milky upon agitation, but separating on standing, leaving the water clear and impregnated with their odor and taste; this impregnation is more complete when water is distilled with the oils, or from the plants containing them. When triturated with magnesia or its carbonate, they are more readily soluble in water; sugar also increases their solubility. Alcohol readily dissolves the greater part of them, as well as ether; the more oxygen they contain the more easily soluble are they. They dissolve sulphur

and phosphorus with the aid of heat, but deposit them on cooling. Brown, unctuous, fetid substances called *Balsams of Sulphur*, are made by boiling them for a long time with sulphur. Chlorine or iodine converts them into resin, and then combines with the resin. They unite with several vegetable acids, but are decomposed by the strong mineral. Caustic alkali converts them into resin, which unites with the alkali and forms soap. Several metallic oxides, and various salts which easily part with oxygen, convert them into resin. They dissolve fixed oils, fats, resins, camphor, and several of the vegetable alkalies.

The volatile oils consist of two distinct principles, *Stearoptene* or a solid matter, and *Eleoptene* or a fluid. These principles congeal at different temperatures, and may be separated by pressing the oil, when frozen, between folds of bibulous paper, the stearoptene remains between the folds, while the eleoptene is absorbed by the paper, and may be obtained from it by distillation with water. Stearoptene is often deposited by volatile oils upon standing, in a solid crystalline form; sometimes these deposits are oxides, and when formed under the influence of water, are frequently hydrates of the respective oils. The ultimate constituents of the volatile oils are usually carbon, hydrogen, and oxygen; some of them contain nitrogen, and the oils of horseradish and mustard contain sulphur. Volatile oils leave a greasy stain upon paper, which disappears by heat; this is not the case with fixed oils, and they should always be preserved in small, well-stopped bottles, and excluded from the light.

Volatile oils are frequently adulterated with fixed oils, resinous substances, and alcohol. Fixed oils may be known by their leaving a permanent greasy stain upon paper, while that produced by the volatile oil disappears entirely when exposed to heat. When the adulterated oil is distilled with water, both resin and fixed oil remain behind. Alcohol may be detected by the milkiness of the oil when agitated with water, and, after the liquids have separated, the water occupies more space and the oil less than before. Various methods have been recommended to detect the presence of alcohol with essential oil. M. Beral puts twelve drops of the suspected oil in a perfectly dry watch-glass, and then adds a piece of potassium about as large as the head of a pin. If the potassium remain for twelve or fifteen minutes in the midst of the liquid, there is either no alcohol present, or less than four per cent.; if it disappear in five minutes, the oil contains more than four per cent. of alcohol; if in less than a minute, twenty-five per cent. or more. M. Borsarelli introduces small pieces of chloride of calcium, well dried and perfectly free from powder, into a small cylindrical tube, closed at one end, and about two-thirds filled with the oil to be examined, and heats the tube to 212° , occasionally shaking it. If there be a considerable proportion of alcohol, the chloride is entirely dissolved, forming a solution which sinks to the bottom of the tube; if only a very small quantity,

the pieces lose their form, and collect at the bottom in a white adhering mass; if none at all, they remain unchanged. J. J. Bernoulli adds dry acetate of potassa to the oil; if alcohol be present the salt is dissolved, forming a solution from which the volatile oil separates. If the oil be free from alcohol, the salt remains dry therein. Wittstein, who speaks highly of this test, has suggested the following mode of applying it as the best: In a dry test-tube, about half an inch in diameter, and five or six inches long, put not more than eight grains of powdered dry acetate of potassa; then fill the tube two-thirds full with the volatile oil to be examined. The contents of the tube must be well stirred with a glass rod, taking care not to allow the salt to rise above the oil; afterward set aside for a short time. If the salt be found at the bottom of the tube dry, it is evident that the oil contains no spirit. Oftentimes, instead of the dry salt, beneath the oil is found a clear syrupy fluid, which is a solution of the salt in the alcohol, with which the oil was mixed. When the oil contains only a little alcohol, a small portion of the solid salt will be found under the syrupy solution. Many oils frequently contain a trace of water, which does not materially interfere with this test, because, although the acetate of potassa becomes moist thereby, it still retains its pulverulent form. A. Oberdoffer places from two to four drachms of the suspected oil in a flat glass plate, in the middle of which is placed a small glass stand (the inverted neck of a six-ounce bottle is very suitable for this purpose) on which a watch-glass, with five to ten grains of platinum-black, is supported, and the whole covered with a glass bell open at the top. After a strip of moistened litmus paper has been laid over the vessel containing the platinum-black, the operator observes the reaction. In the course of a few minutes, oil containing alcohol, begins to redden the litmus paper, which, in the space of a quarter or half an hour, is completely accomplished; upon which, the eliminated vapor of acetic acid is deposited on the interior of the glass bell if the alcohol was present in sufficient quantity, and can be recognized distinctly by its odor. To remove all doubt, he washes the platinum-black, after an hour has elapsed, with a little water, filters, saturates the filtrate carefully with potassa, and adds neutral chloride of iron, by which the characteristic color of acetate of iron is obtained; and, after boiling, the fluid becomes decolorized, and the hydrated oxide of iron is precipitated. From a series of experiments, he concludes that it is possible, in this way, to detect the presence of one to two per cent. of alcohol, and that with five per cent. the odor is sufficient, with most oils, to prove the admixture of alcohol. How far this method may be interfered with, by some oils which have very acid reactions, or particularly pungent odors, experience must teach; but with a great number of oils, it has been found available, even with oil of bitter almonds.

It is frequently the case, that volatile oils of small value are mixed with the more costly; these may be detected by their taste, smell, and

specific gravity. Oil of turpentine, which is a common adulteration, may be known by remaining in part undissolved, when the oil is treated with three or four times its volume of alcohol of the specific gravity 0.84. (*For Volatile Oils, see Part III.*)

TABLE OF SPECIFIC GRAVITIES OF FIXED AND VOLATILE OILS.

Oils.	Temperat.	Specific Gravity.	Oils.	Temperat.	Specific Gravity.
Amygdalæ....		.917 to .920	Menthæ Piperitæ		.902 to .920
do Amaraæ..		1.043 " 1.084	Menthæ Viridis.		.914 " .975
Anethi		.881	Monardæ		
Anisi.....		.976 " .990	Morrhua, pure..	72° F.	.917
Anthemidis...		.908	do pale.....	63° F.	.923
Bergamii		.885	do light-brown	"	.924
Cajuputi.....		.914 " .927	do dark-brown	"	.929
Cari		.931 " .946	Myristicæ		.920 to .948
Caryophylli...		1.034 " 1.061	Olivæ, pure.....		.915
Chenopodii...		.908			(Kane .867
Cinnamomi...		1.035	Origanî		{ Lewis .940
Copaibæ		.910			{ Brande .909
Cubebæ		.929	Pimentæ		1.021
Fœniculi		.997	Pulegii.....		.925 to .978
Gaultheriæ ...		1.173	Ricini.....		.964
Hedeomæ		.948	Rosæ	90° F.	.832
Juniperi.....		.911	Rosmarini, com.		.911
Lavandulæ,c'm	68° F	.898	do rectified..		.888
do rectified		.877	Rutæ		.837
do from the		—	Sabinæ		.915
whole herb		.920	Sassafras		1.094
Limonis, com.		.851	Succini, rectified.	75° F.	.758
do rectified	71° F.	.847	Terebinthinæ ...	72° F.	.86
Lini		.932	Valerianæ		.934

The above specific gravities are those usually given, yet they probably vary, according to circumstances; and unless otherwise named, the temperature of each is about 60° F.

OLEUM BUBULUM.

Neats-foot Oil.

THE OIL PREPARED FROM THE BONES OF THE BOS DOMESTICUS.

Preparation.—The feet of the ox, having been deprived of the skin and hoof, are subjected to a long-continued boiling in water; the oil and fat existing in them being melted, rise to the surface, from which they are removed, and again placed in fresh water, which is heated to nearly 212°. After standing for some time, various impurities settle at the bottom, and the oil is taken from the surface. If further purification is desired, it is to be again placed into water, and kept for twenty-four hours at such a temperature as will permit the fat that remains with the oil to separate from it. After the liquid has cooled, the fat concretes into a mass, and the oil remains in the state of a thin fluid, which is to be filtered through small pieces of charcoal, free from powder.

History.—Neats-foot Oil, when purified properly, is a yellowish, inodorous, and bland liquid; but in general, it retains both a disagreeable

odor and taste. It congeals with much difficulty, remaining fluid at very low temperatures, and is used for greasing machinery in order to lessen friction, likewise by saddlers and shoemakers, to soften and preserve leather, and prevent its cracking.

Properties and Uses.—This oil is emollient and relaxant, and may be applied with advantage to the breast and throat, in croup or cough, rubbing it on with brisk friction. It likewise enters into various extemporaneous liniments and poultices.

OLEUM MORRHUÆ.

Cod Liver Oil.

A FIXED OIL OBTAINED FROM THE LIVER OF GADUS MORRHUA.

Description.—The *Gadus Morrhua* of Linnæus, and *Morrhua vulgaris* of Storer and other Naturalists, or the common *Cod-fish*, belongs to the *Class Pisces*, *Order Jugulares* (*Linnæus*)—*Malacopterygii Subbrachiati*, and *Family Gadidæ*; its *Generic character* is recognized by the ventrals attached under the throat, and attenuated to a point. The fish is usually between two and three feet long, with brown or yellowish spots on its back. The body is moderately elongated and somewhat compressed, and covered with soft, rather small scales, of which the head is destitute; of the fins, which are soft, there are three on the back, two anal, and a distinct caudal; and the fin under the throat is narrow and pointed. The jaws are furnished with pointed irregular teeth in several ranks. The gills are large with seven rays. It inhabits the Northern Atlantic Ocean, and is found in abundance on the banks of Newfoundland.

History.—Cod-liver Oil, as it is generally called in commerce, is obtained from several of the species of the Genus *Gadus*—as the codfish, coal-fish, and burbot; and sometimes from the pollock, hake, and haddock. The oil is obtained by several processes; one of which is to heat the livers with water, until they are broken up into a pulstaceous mass, and then throw them upon a strainer placed over some vessel into which the liquid flows, the oil rises to the surface, from which it is drawn off, strained, and prepared for market. Another and improved plan is to heat the livers in a large vessel by steam externally applied, and then drain the pulstaceous mass as in the other process. The oil is said to be sometimes procured by expression. Again, it is obtained by the putrefactive decomposition of the livers, when placed in quantities in barrels or other vessels, the oil rising to the surface as it escapes from the disintegrating tissue.

There are three varieties of Cod-liver Oil in commerce: 1st. The *White* or *Pale-yellow*, which is prepared from fresh sweet livers, and varies in color from the slightest tint of transparent yellow to a fine golden yellow; 2d. The *Brownish-yellow*, obtained from livers running

gradually to putrefaction, and of a chestnut-brown color; and 3d. The *Dark-brown*, prepared from livers in an intermediate state, dark-brown and somewhat opaque, except in thin layers. They are generally of the consistence of sperm oil, and have a peculiar odor and taste unlike other oils, and which properties, in a great measure, are the best test for the genuineness of the oil. The smell and taste is similar to that of shoe-leather, as prepared in this country, and when a decided odor of ordinary fish oil is present, we may suspect its purity. All the varieties have an acrid taste, together with a somewhat empyreumatic bitterness in the most impure. The specific gravity at 72° F. varies from 0.915 to 0.9195; at 63° F., the specific gravity of the pale variety is stated at 0.923; of the light-brown 0.924, and of the dark-brown 0.929.

According to analysis, numerous principles have been found in Cod-liver Oil, as gaduin, oleic and margaric acids, butyric and acetic acids, various biliary principles, as fellinic, cholic, and bilifellinic acids, and bilifulvin; a peculiar substance soluble in alcohol; a peculiar substance insoluble in water, alcohol, or ether; iodine, chlorine, and traces of bromine; phosphoric and sulphuric acids, phosphorus, lime, magnesia, soda, and iron. Dr. Winckler has shown that a distinguishing feature of cod-liver oil, consists in its having no glycerin, but in its place, the *hydrated oxide of propyl*.

Gaduin may be obtained by saponifying the oil with soda, decomposing the soap by acetate of lead, and treating the resulting lead soap with ether, which dissolves the oleate of lead and gaduin, leaving the margarate of lead behind. The ethereal solution, which is dark-brown, is decomposed by sulphuric acid, which liberates the brown oleic acid. This owes its color to gaduin, to separate which soda is added in excess, the resulting oleate of soda, which is insoluble in an excess of the alkali, is dissolved in alcohol; and the alcoholic solution is cooled below 32° by which means the oleate of soda is separated, the gaduin remaining in solution. This is precipitated from its solution by the addition of sulphuric acid. Gaduin is a dark-brown substance, brittle and pulverizable when dry, without odor or taste, insoluble in water, and soluble to some extent in alcohol or ether. It is insoluble in nitric and muriatic acids, but is dissolved by sulphuric acid, giving a blood-red color to the solution, from which it is precipitated by water and the alkalies. Alkaline solutions dissolve it; chlorine decolorizes it. It is gradually changed into a blackish-brown insoluble substance, by boiling in alcohol. Its formula is $C_{23}H_{23}O_9$. It is not supposed to be connected with any of the virtues of the oil. The virtues of Cod-liver Oil have been supposed by many to be owing to its bromine and iodine, but these exist in it in too small proportion for much effect. The usual tests cannot detect the presence of the iodine; the oil must be first saponified, and this carbonized before the iodine can be detected. The oil, although capable of dissolving

a larger proportion of iodine, never contains over one part of it in 2000; and if any specimen contains more, it is, probably, fraudulently added.

Cod-liver Oil is liable to adulteration with other fixed oils; for the detection of this there are no perfectly reliable tests. The best, are the peculiar shoe-leather smell and taste; and if a strong lamp-oil odor is perceptible, the oil is impure. The color of the oil is of but little importance, though the pale or light-brown variety is generally esteemed the most. A drop of concentrated sulphuric acid added to a small portion of fresh cod-liver oil, causes a fine violet color, soon passing into yellowish or brownish-red; sometimes it immediately becomes a clear red, or dark-brownish red, without assuming the violet hue, and which is said to occur with oil prepared by boiling the livers with water. Concentrated nitric acid agitated with the oil, produces instantly a pinkish color which soon becomes brown.

Dr. Jongh states that a few drops of concentrated sulphuric acid, change olive oil to a dirty gray color; oil of poppies to a deep-yellow inclining to brown; and ordinary fish oil to a deep-brown color; but when added, drop by drop, to cod-liver oil, a peculiar centrifugal movement is produced from the spot at which the drops fall, and at the same time a beautiful violet tint, which is instantly changed into purple by agitating the oil. This change of color is not owing to the presence of iodine, for other fish-oils which contain iodine do not manifest a similar change, but, as he believes, to the presence of a biliary principle called *Cholinic Acid*. This method, however, although it will distinguish the cod-liver from every other oil, will not answer to distinguish its various adulterations with other fish or vegetable oils. The pure cod-liver oil contains in 100 parts from 0.020 to 0.030 parts of iodine, and oils containing a less proportion of this substance, are to be considered as adulterations or mixtures with non-remedial oils. Other oils, when mixed with iodine or various iodurets, may be readily detected by their yielding these articles to water or alcohol when agitated with them, while genuine cod-liver oil never gives up its iodine to these fluids. The genuine oil, when carbonized, without being first saponified, and the carbon then separated by means of alcohol, does not betray the least trace of iodine, while other oils treated in the same manner are invariably detected by manifesting the presence of iodine or any of the medicinal iodurets. Again, the genuine oil, when saponified, never communicates to the mother water the slightest trace of iodine, while the contrary is the case when other oils combined with iodine, either in a free state or in any of its combinations, are subjected to saponification.

Exposure to the air effects a change in the properties of the cod-liver oil, consequently it should always be kept well stopped; and the best mode of keeping it, is to fill bottles with it, which are of sufficient size to contain the quantity generally wanted for use at one time, and have

them well stopped. By this means it may be kept for some time without any sensible change.

Properties and Uses.—Cod-liver Oil is nutritive and alterative. It has been long used as a domestic remedy in chronic rheumatic and strumous diseases, especially in the northern parts of Europe, and has been in general medical use, only since the treatise upon it by Professor Bennett of Edinburgh, in 1841, although employed occasionally in the profession as early as 1766. The diseases in which it is said to be most efficient are chronic rheumatism, strumous diseases, enlargements of the glands, strumous ophthalmia, pseudo-syphilis, in scrofulous constitutions, various chronic cutaneous diseases, and even phthisis. Gout, caries, rachitis, and tabes mesenterica, have, it is said, yielded to its influence. It is also asserted to have been found useful in diseases of the joints and spine, lupus, obstinate constipation, worms, and incontinence of urine; and may be advantageously employed in all chronic diseases, in which the disease appears to consist mainly in impaired digestion, assimilation and nutrition. Externally, used in opacities of the cornea, a drop or two placed on the cornea with a camel's hair pencil also in various chronic cutaneous diseases, rhagades, chaps, eczema, excoriations and fissures. Dose, half a fluidounce, twice a day, or more but it is best to begin with small doses at first, say one drachm only, in order to lessen the risk of nausea and vomiting. Patients soon accustom themselves to its use, without repugnance. It is best given alone, followed by some claret, or a little sugar and cinnamon powder, or prepared with aromatic oils, the same as castor oil, which see. Its use is contra-indicated in plethora, or where there is a strong tendency to it. When long used, it is said to frequently occasion an eruption on the surface of an eczematous character. But little advantage will be apparent from the administration of cod-liver oil, until its use has been persevered in for five or six weeks, though it often commences earlier. Whether it deserves all the encomiums passed upon it, or is as efficient an agent as stated, in the various forms of disease in which it has been recommended is yet a matter of some uncertainty; time is required to fully and correctly ascertain its merits. Dr. Jongh prefers the darker colored oils which he thinks act more promptly than the paler kinds. He considers this to be owing to their different chemical composition, which varies according to the mode adopted in obtaining them; by analysis he has shown that the lighter-colored oils are the richest in inorganic principles while the darker-colored contain a greater abundance of the bilious principles and volatile acids, on the presence of which last constituents he believes their medical virtues chiefly to depend.

OLEUM OLIVÆ.

Olive Oil.

Nat. Ord.—Oleaceæ. *Sex. Syst.*—Diandria Monogynia.

OIL FROM THE FRUIT OF OLEA EUROPEA.

Description.—The Olive tree is an evergreen, with hoary, rigid branches, and covered with a grayish-bark. It is usually from fifteen to twenty feet high, though frequently attaining a much greater size. The wood is hard and compact, of a dark-yellowish color, susceptible of a high polish. The leaves are opposite, subsessile, firm, lanceolate, entire, mucronate, two or three inches long, smooth, dull green above, hoary beneath, and with their edges somewhat reverted. The flowers are small, whitish, and are disposed in opposite clusters in the axilla of the leaves, which are on short peduncles, erect, about half as long as the leaves, and furnished with small, obtuse, hoary bracts. The calyx is obtuse and four-cleft; the corolla is white, monopetalous, spreading, and divided into four ovate, obtuse segments. The stamens are two, shorter than the corolla, supporting large elliptical anthers, and a single, slender, erect style, with a bipartite stigma. The fruit is a smooth, oval drupe, of a violet color when ripe, of an unpleasant, bitter taste, but abounding in a bland oil, and inclosing an ovate, oblong, rugose nut.

History.—The native country of the Olive tree is unknown, though supposed to be originally from Asia; at present it is extensively cultivated in the South of Europe, especially in Spain, Southern France, Sicily, and Italy. After its second year, it commences bearing fruit, and is in full bearing at six years, and is of long duration, perhaps centuries. There are several varieties of this tree, differing in the size and form of the leaves, and in the magnitude, color, and taste of the fruit. The bark of the olive tree was formerly used in medicine; it, together with the leaves, have an acrid and bitterish taste. In hot countries a morbid product exudes from the tree, incorrectly termed Olive-gum or Lecca-gum; it consists of a resin, a peculiar crystalline principle called *Olin* or *Olivin*, and benzoic acid. This was formerly used in medicine, but is not employed at present. The fruit, gathered when not quite ripe, is hard and excessively acrid; but when macerated in lime-water or an alkaline ley, and then pickled in brine, it constitutes the olive of commerce, a pleasant and highly esteemed article of diet.

The only product of the plant which is officinal is the oil obtained from the fleshy pericarp of the fruit. The fruit is gathered just before they are fully ripe, or when it begins to redden, because if delayed until they are thoroughly matured, the tree will bear only in alternate years. It is carefully collected by hand, and the harvest completed, if possible, in one day; it is then immediately carried to the mill, in which it is bruised, care being taken that the millstones are set far enough apart from each other as not to crush the nut. The pulp is put in bags and

moderately pressed; the product obtained is of the first quality, and is called *Virgin oil*. The remaining marc is broken in pieces, moistened with hot water, and again pressed; the oil from this second operation is of an inferior quality, but sufficiently good for table use, and for preparing fine soaps—it constitutes the ordinary olive oil of commerce. The marc is again broken up, well soaked in water, allowed to ferment, and again submitted to pressure; a coarse, inferior oil is obtained fit only for burning, plasters, coarse soaps, etc. Other varieties are introduced into the process in different countries. The finest oil comes from Provence and Florence, and sometimes from Genoa and Lucca; the commoner sort, termed Gallipoli oil, comes from Naples. The best quality is imported in glass bottles, or in flasks, surrounded by a network made of grass, and known as Florence flasks.

Pure olive oil is an unctuous liquid, of a pale-greenish yellow tint, almost inodorous, and a bland, faintly sweet, oleaginous taste; it will keep for a long time without becoming rancid. Its specific gravity is 0.9153. It is only partially dissolved by alcohol, unless this be in large proportion, and is completely soluble in twice its volume of ether. At a temperature of 38° , a portion of it solidifies in white crystalline grains, which is a compound of margarin and olein; the liquid portion is uncombined olein. Olive oil contains in 100 parts, 72 of olein, and 28 of margarin. Margarin may be obtained by squeezing the crystals which form at a temperature of about 20° in bibulous paper; the paper absorbs the olein, and leaves the concrete margarin. Few vegetable oils contain so large a proportion of this solid principle. Olive oil is not a drying oil; it undergoes saponification when heated with alkaline solutions, freeing glycerin, and forming soluble salts in which the alkali is combined with several fatty acids. Nitrous acid, or nitrate of mercury converts it into a fatty principle, called Elaidin, which concretes at temperatures below 97° , and is converted by saponification into glycerin, and elaidic acid. When exposed to the air or heat, olive oil is apt to become rancid, acquiring a thicker consistence, a sharp taste, a disagreeable smell, and a darker color. It is often adulterated with oils of poppy seeds, rape seeds, etc., which may be detected by the aid of hyponitrous acid and heat, which, in the course of a few hours, renders the whole of the pure article a firm fatty mass—even if so little as five per cent., of any other oil be present, the consolidation is much less firm and more tardy. M. Diesel states that nitric acid colors pure olive oil green, but if it be mixed with rape oil, it becomes of a strong yellowish-gray color. Since the manufacture of lard oil, it has been extensively used to adulterate olive oil, and large quantities of it are exported annually from this country to France for this purpose; the reaction with nitric acid, will, probably, detect this adulteration.

Properties and Uses.—Olive, or *Sweet oil*, as it is often called, is nutrient, emollient, laxative, and anthelmintic. A fluidounce or two

purges, but is uncertain and often ineffective. Used as a demulcent in catarrh and other pulmonary affections, as a laxative in irritation of the intestinal mucous membrane, as an emollient and antidote in poisoning by alkalies, with which it forms soap, but not as an antidote to opium, arsenic, copper, etc., in which cases its administration is improper. In poisoning by cantharides, on account of its being an excellent solvent of the active principles, it augments the danger. It is principally employed in the composition of liniments, ointments, cerates and plasters. As an article of diet, it is exceedingly improper for dyspeptics. Smearred over the skin, it is thought to be beneficial in the treatment of plague, scarlatina, and some other exanthematous affections. According to Mr. Sidney H. Maltass, a strong decoction of the leaves of the olive tree, given in doses of a wineglassful every three hours, has cured the most obstinate and severe forms of intermittent fever. He considers it more effectual than quinia.

Off. Prep.—Emplastrum Plumbi; Emplastrum Plumbi Compositum; Emplastrum Resinæ Compositum; Linimentum Ammoniaë; Linimentum Nigrum; Unguentum Acidi Nitrici; Unguentum Cetacei; Unguentum Ipecacuanhæ; Unguentum Myricæ; Unguentum Plumbi Compositum.

OLEUM RICINI.

Castor Oil.

Nat. Ord.—Euphorbiacæ. *Sex. Syst.*—Monœcia Monadelphica.

THE OIL OF THE SEEDS OF RICINUS COMMUNIS.

Description.—*Ricinus Communis*, the *Castor oil bush*, in the United States is a herbaceous annual, with a white, frosted or glaucous, hollow, smooth *stem*, somewhat purplish toward the top, branching, and from three to eight feet in height. In the East Indies and Africa, it becomes a tree attaining the height of thirty or forty feet, and is perennial. The *root* is long, thick, and fibrous. The *leaves* are large, alternate, on long tapering purplish petioles, peltate, palmate, with seven or nine pointed, serrate lobes, smooth on both sides, of a bluish-green color. The *flowers* are monœcious, stand upon jointed peduncles, in long, green, glaucous, pyramidal spikes or racemes which spring from the divisions of the branches. The male flowers from the lower part of the spike, the females the upper; both are destitute of corolla. The *calyx* of the male flower is divided into five oval, concave, pointed, reflected, purplish segments, and incloses numerous stamens, which are united into fasciculi at their base. That of the female has three or five narrow lanceolate segments; and the ovary, which is roundish and three-sided, supports three linear, reddish stigmas, forked at their apex. The *fruit* is a roundish, glaucous capsule, with three projecting sides, covered with tough spines, and divided into three cells, each containing

one seed, which is expelled by the bursting of the capsule. *Seeds*, about as large as a bean, ovate, compressed, obtuse at the extremities, smooth and shining, of a gray or ash color, marbled with black or reddish-brown spots and veins.

History.—*Ricinus Communis*, or *Palma Christi*, is a native of India, and has become naturalized in many warm climates; it is extensively cultivated in many parts of the United States, where it flowers in July and August, ripening its seeds in August and September. The official part is the fixed oil obtained from the seeds. The seeds have a small yellowish tubercle at one end, from which an obscure longitudinal ridge proceeds to the opposite extremity, dividing the sides upon which it is situated into two flattish surfaces. Its variegated color depends upon a very thin pellicle, closely investing a hard brittle, blackish, tasteless, easily separable shell, within which is a thick, fleshy, oleaginous, white nucleus or kernel, inclosing a large, dicotyledonous, leafy embryo. From its resemblance to the dog-tick, the Latin name, *Ricinus*, was probably derived. The husk constitutes twenty-four per cent. of the seed, and consists chiefly of ligneous fiber, with a little gum, resin, and extractive matter. The nucleus constitutes sixty-nine per cent. of the seed when dry, and contains 46.19 parts of fixed oil, 2.40 of gum, 20.00 of starch and lignin, and 0.50 of soluble albumen. It must also contain a peculiar acrid and purgative principle, which has not yet been obtained, for it is powerfully active after the oil has been expressed. The seeds easily become rancid, and are then unfit for the extraction of the oil, which is acrid and irritating. The fixed oil is the official Castor oil.

Castor oil is obtained from the seeds by three processes: First, by decoction; the seeds are deprived of their husks, steeped for a night in cold water, and then boiled for two hours in a fresh portion of water, dried in the sun and bruised, and lastly boiled in fresh water, and constantly stirred, till all the oil separates and rises to the surface; this is skimmed or strained off, and boiled with a small quantity of water to dissipate the acrid principle. The above process is the one said to be pursued in the East Indies; in the West Indies the same course is followed, except that the seeds are not steeped or boiled before being bruised. This mode is very apt to furnish an acrid and irritating product, and a brownish-colored oil. The second method is by alcohol, which process has been practiced in France, but the oil obtained is said to become speedily rancid, although very pure. The third method is by expression, which is the one practiced in this country, and when properly conducted, gives a bland and colorless result. The seeds after having been thoroughly cleansed from dust and fragments of capsules, and other impurities with which they may be mixed, are placed into a shallow iron-reservoir, where they are submitted to a very gentle heat, no greater than can be borne by the hand, and not sufficient to scorch or

decompose them; this warmth renders the oil sufficiently liquid for easy expression. They are then placed into a powerful screw-press, and yield a whitish oleaginous liquid, which is transferred to vessels holding large quantities of water, and boiled for some time. As impurities rise to the surface they are skimmed off, until at last the clear oil only is left floating upon the surface, the albumen having been coagulated by the heat, forms a whitish layer between the oil and the water, and the mucilage and starch are dissolved by the water. The oil is now carefully removed, and is again boiled with a minute proportion of water, for the purpose of clarifying it, and rendering it less acrid by driving off the acrid volatile matter; and the heat is continued till aqueous vapors cease to rise, and till a small portion of the oil, taken out in a vial, presents a perfect transparency when cooled. Care, however, must be taken not to push the heat too far, or else the oil will become brownish, and acquire an acrid peppery taste. One bushel of good seeds yields five or six quarts of oil. Sometimes, however, after expression, the oil is merely allowed to stand for a time, until all precipitation has ceased, and then the supernatant liquid is drawn off. When not carefully prepared, castor oil is apt to deposit a sediment upon standing; and the apothecary frequently finds it necessary to filter it through coarse paper before dispensing it.

When pure, castor oil is a thick, viscid, colorless fluid, slightly odorous, with a sweetish, mildly nauseous taste, followed by a slight sense of acrimony. In the shops it is often found tinged with yellow, having an unpleasant smell, and occasionally brownish, with a hot acrid taste. The most esteemed castor oil is the *cold drawn*, which is made by expression without heat. It is one of the heaviest of the fixed oils, having a density of .964 at 60°. When exposed to cold a little below 32°, it slowly becomes thick and turbid, and at length deposits a very few crystalline grains of margarin, though it is stated that no margarin separates, if the oil has been previously heated to 212° either with or without water. At a temperature above 212° the oil itself becomes altered and acquires acrid properties. Exposed to the air it slowly thickens without becoming opaque, acquires rancidity, and finally dries up; it belongs to the drying oils. It is insoluble in water, soluble in all proportions in alcohol or ether, and alcohol of the specific gravity of 0.842 takes up about three-fifths of its weight—a property not possessed by any other common fixed oil except the concrete palm oil. It readily combines with other fixed as well as volatile oils; the alkaline solutions dissolve and saponify it, producing acids termed the *ricinic*, *ricinoleic*, and *ricino-stearic*. Hyponitrous acid will convert twenty times its weight of castor oil in seven hours, into a firm, yellow, solid substance, called *Palmin*, which is saponifiable by alkalies, yielding *Palmic acid* and glycerin. Castor oil when added to other fixed oils, renders them more soluble in alcohol. It may be distilled at a temperature of about 510°.

when it undergoes important alterations, yielding three acids, apparently identical with those above-named. The proximate constitution of castor oil, is imperfectly understood by chemists.

It is stated that rancid acrid castor oil may be deprived of its disagreeable odor and taste, as well as of its acrimony, by boiling it for fifteen minutes with water and a little calcined magnesia. If it be turbid, it should be clarified by filtration through coarse paper. Castor oil is much employed in the preparation of an article which is extensively sold throughout the country for *bear's oil*; it is composed of four fluidounces of castor oil, mixed with two fluidrachms of an aqueous solution of salts of tartar (carbonate of potassa) and scented with bergamot, lavender, or other aromatic oil.

Properties and Uses.—The castor oil seed or bean is a powerful drastic cathartic and irritant, and has proved fatal to man when taken to the extent of twenty seeds at once. Yet the oil expressed from it is only a mild cathartic, operating promptly, producing thin, feculent, but not watery stools, causing but little griping or nausea. From its mildness of action, it is especially adapted to young children, pregnant or puerperal females, likewise to hemorrhoidal affections, colic, diarrhea, dysentery, enteritis, after the reduction of hernia, obstinate constipation, collections of indurated feces, accumulation of acrid secretions, and in worms. One part of oil of turpentine mixed with three or four parts of castor oil increases its purgative and anthelmintic effect. The greatest objections to this cathartic are its nauseous taste and its tendency to cause sickness or unconquerable disgust. This may be overcome by adding to one pint of the oil half a fluidounce each of oils of origanum and wintergreen, or one ounce of sassafras oil; the dose of this may be given in sweetened water. Any other aromatic oils will answer equally as well. When not contra-indicated it may be taken in wine, spirituous liquors, or the froth of porter, likewise in cinnamon or peppermint water. I find it a very pleasant mode of administration to boil the dose of oil with about a gill of good sweet milk for a few minutes, sweeten with loaf-sugar, and flavor with essence of cinnamon or other favorite aromatic; it somewhat resembles custard in its taste and appearance, and is readily taken by even the most delicate stomach. Stuncke states that castor oil saponifies readily with alkalies, and gives with soda a white solid soap, which, in the form of pills, is a certain and agreeable purgative. According to M. Parola, an ethero-alcoholic extract, and an ethereal or alcoholic tincture of the seeds, operate in much smaller doses than the oil, and with less disposition to irritate the bowels or to cause vomiting. As an enema, castor oil may be used in the quantity of two or three fluidounces, mixed with some mucilaginous liquid. Externally, it has been recommended in itch, ringworm, and other cutaneous diseases. Dose, for an adult, a fluidounce or a fluidounce and a half; for an infant, one, two, or three fluidrachms, according to its age.

Equal parts of castor oil and copal varnish, form an excellent local application for hemorrhoidal affections.

We are informed by Dr. J. O. McWilliam that the natives of the Cape de Verd Islands, have common recourse to a remedy called "Bofareira," for the purpose of accelerating and increasing the flow of milk, not only from the breasts of childbearing women, where that secretion was tardy in appearing, or deficient in quantity when it did appear, but, on occasions of emergency, from the breasts of women who are not child bearing, or who have not given birth to, or suckled a child for many years. The leaves of the plant, Bofareira, are used, and which proved to be on investigation, the "*Ricinus Communis*," or common castor oil plant. The *white* bofareira is used, and carefully selected from the *red* bofareira, which appears to be a variety of the same species, but which they say is a powerful irritant, producing an immediate and often immoderate menstrual discharge, as has resulted in cases where it has been occasionally used in mistake. The *white*, or that which possesses galactagogue qualities, is recognized by the natives by the light-green color of the stem of the leaf, while the leaf stem of the red is of a purplish-red hue.

In cases of childbirth, when the appearance of the milk is delayed (a circumstance of not unfrequent occurrence in those islands), a decoction is made by boiling well a handful of the white bofareira in six or eight pints of spring water. The breasts are bathed with this decoction for fifteen or twenty minutes. Part of the boiled leaves are then thinly spread over the breasts, and allowed to remain until all moisture has been removed from them by evaporation, and probably, in some measure, by absorption. This operation of fomenting with the decoction and applying the leaves, is repeated at short intervals until the milk flows upon suction by the child, which it usually does in the course of a few hours.

On occasions where milk is required to be produced in the breasts of women who have not given birth to, or suckled a child for years, the mode of treatment adopted, is as follows: two or three handfuls of the leaves of the *Ricinus* are taken and treated as before. The decoction is poured, while yet boiling, into a large vessel, over which the woman sits so as to receive the vapor over her thighs and generative organs, clothes being carefully tucked around her so as to prevent the escape of the steam. In this position she remains for ten or twelve minutes, or until the decoction cooling a little, she is enabled to bathe the parts with it, which she does for fifteen or twenty minutes more. The breasts are then similarly bathed, and gently rubbed with the hands; and the leaves are afterward applied to them in the manner already described. These several operations are repeated three times during the first day. On the second day, the woman has her breasts bathed, the leaves applied, and the rubbing repeated three or four times. On the third day, the

sitting over the steam, the rubbing, and the application of the leaves to, with the fomentation of, the breasts, are again had recourse to. A child is now put to the nipple, and, in a majority of instances, it finds an abundant supply of milk. In the event of milk not being secreted on the third day, the same treatment is continued for another day, and if then there still be want of success, the case is abandoned, as the person is supposed not to be susceptible to the influence of the Bofareira.

Women with well-developed breasts are most easily affected by it, while those with small and shriveled breasts have the uterine system acted upon, bringing on the menses, if their period be distant, or causing their immoderate flow if their advent be near. Exposure to cold is carefully avoided by women brought under its influence; they scrupulously abstain from wetting the hands or feet with cold water. It is said to affect virgins of adult age, similar to child-bearing women. It sometimes produces swelling and pain in the breasts and axillary glands, pain in the back, and an increase of a leucorrhœal discharge.

This remedy, and the red Bofareira, as an emmenagogue, both of which are common to this country, have been already tried by physicians, and the results have been sufficiently favorable to render further investigation very desirable.

Off. Prep.—Mistura Chenopodii Composita; Mistura Olei Composita.

OLEUM TEREBINTHINÆ.

Oil or Spirit of Turpentine.

Nat. Ord.—Pinacæ. *Sex. Syst.*—Monœcia Monadelphia.

History.—The term Turpentine is usually given to vegetable juices, liquid or concrete, and which consist of resin, and a peculiar volatile oil, separated by distillation, and called *Oil of Turpentine*. It is derived from the juice of the Yellow or Pitch Pine, *Pinus Palustris*, as well as other pines, and the *Abies Balsamæa*, etc. Beside the turpentine from these trees, there are others, as the common European Turpentine, *Terebinthina Vulgaris*, from the *Pinus Sylvestris*; the Larch or Venice Turpentine, *Terebinthina Veneta*, from the *Larix Europea* and *Abies Larix*; the Chian or Cyprus Turpentine, *Terebinthina Chia*, or *Cypria*, from the *Pistacia Terebinthus*; the Bordeaux Turpentine, from the *Pinus Maritima*, and many others. All the turpentine are generally thick, of the consistence of honey, and of a light yellow or brown color; some are turbid, others are transparent, of a strong smell, *sui generis*, and of an acrid, bitter, and nauseous taste. The Venice turpentine is usually tolerably liquid, slightly greenish, of a strong, not unpleasant smell, and of a warm and bitter taste. The turpentine are readily soluble in ether or alcohol, and unite with fixed oils. All the terebinthinate preparations owe their medical properties to their volatile oil, and they are seldom used at present, except in salves, plasters, and the like.

Oil of turpentine is obtained by distillation of the turpentine with or without water; but in the latter case a much higher temperature is required, and the product is liable to be empyreumatic. The residue in the still, after the distillation of the oil, is resin. When it is necessary to obtain absolutely pure oil of turpentine, it should be redistilled from a solution of caustic potassa. Large quantities of the oil are distilled in North Carolina for exportation. The oil, or Spirits of Turpentine as it is frequently called, is, when pure, a clear, transparent, colorless, very liquid fluid, having the specific gravity of 0.86 at 72° F. It possesses a powerful, penetrating, balsamic, peculiar odor, and a disagreeable, aromatic, bitter, and sometimes acrid taste. It is lighter than water, is very volatile and inflammable, and boils at 312°, the temperature rising to 350° as the ebullition proceeds. A cold of—17° causes it to deposit white crystals, which are a hydrate of the pure oil. It burns with a fierce, dense, red flame and much black smoke. Exposed to the air it slowly absorbs oxygen and becomes yellow and thick, losing much of its activity. It is very sparingly soluble in water, moderately so in alcohol, and readily in sulphuric ether. It dissolves resins, fixed oils, fats, many alkaloids and neutral crystalline principles from the vegetable kingdom, and caoutchouc. When immersed in chlorine gas, it inflames; and iodine dropped into it is partly dissolved, and partly dispersed with an explosion. It absorbs muriatic acid gas in large quantity, forming with it two compounds, one a dense red liquid, the other a white crystalline compound resembling camphor, and hence called *Artificial camphor*; this last consists of an equivalent of the acid, and one of the radical oil of turpentine or camphene, and is therefore a muriate of camphene. Nitric acid changes oil of turpentine into resin, and by long boiling, into turpentic acid. Exposed to light and air oil of turpentine deposits a white solid matter in acicular crystals, which are inodorous and tasteless, insoluble in cold water, but soluble in ether or alcohol. The pure or radical oil is denominated Camphene, and consists of ten equivalents of carbon, and eight of hydrogen; but when kept for some time it always contains a little absorbed oxygen. Combined with one equivalent of oxygen, camphene forms camphor; and with two equivalents it forms camphoric acid.

Properties and Uses.—The actions of oil of turpentine are complex. It is irritant, stimulant, cathartic, diuretic anthelmintic, and in relation to chronic mucous discharges, astringent. Given in large doses it occasions slight vertigo, or a sense of fullness in the head, with a feeling similar to that of intoxication, or a state resembling trance, attended frequently with nausea, and frequently followed by active catharsis; sometimes it creates pain in the stomach, sickness and vomiting; more frequently, especially when absorbed, it gives rise to violent strangury bloody urine, and other symptoms of irritation of the bladder and kidneys, at the same time imparting the odor of violets to the urine.

If purgation occurs, the other effects seldom present themselves. In medicinal doses, it warms the stomach, quickens the pulse, increases the temperature of the surface, and in small doses, frequently repeated, it stimulates the kidneys, increasing the urinary secretion. In some persons, its internal administration occasions an erythematic eruption on the skin. As a stimulant it is particularly useful in the typhoid stage of various febrile diseases, where there is reason to suspect ulceration of the mucous membranes; as in cases where the tongue becomes dry and brown, the skin dry, and tympanitis present, with sometimes a slight delirium, the frequently-repeated use of small doses will remove all these symptoms, and the patient gradually recover. It is supposed, in these instances, to effect a healthy change on the ulcerated intestinal surfaces. It is likewise recommended in neuralgia, chronic rheumatism, dropsy, suppression of urine, worms, especially tenia—tympanitic distension in typhoid fever, peritonitis, or other diseases—chorea, hysteria, croup, colic, jaundice, and in cases where gravel is habitually carried off by copious discharge of lithic acid, and lithate of ammonia. It has a tendency to diminish excessive mucous discharges, and has been employed with advantage in chronic catarrh, chronic dysentery, chronic diarrhea, chronic inflammation of the bladder, gleet, chronic gonorrhea, and leucorrhea. The dose, in ordinary cases, is from five drops to half a fluidrachm, and even to one drachm, repeated every hour or two in acute disease, and every three or four hours in chronic. In the course of its action it is absorbed, and imparts its odor to the breath and perspiration. In doses varying from twenty minims to a fluidrachm, according to the urgency of the symptoms, and repeated every three or four hours, it is a most efficacious astringent, and may be used in epistaxis, hematemesis, hemoptysis, and other sanguineous discharges. It may be administered in water, flavored with some agreeable aromatic syrup, or in infusion of matico, in hemoptysis; in the decoctions of uva ursi, epigea, or eupatorium, etc., in hematuria; or in the decoction or infusion of Peruvian bark in purpura hemorrhagica. Where much arterial blood has been lost, muriated tincture of iron will form a valuable adjunct. Combined with castor oil, it is an excellent vermifuge. Externally it is a rubefacient, and is used as a counter irritant in the form of liniment in rheumatic and paralytic affections, various internal inflammations, in the neighborhood of indolent tumors, to chilblains, indolent and erysipelatous ulcers, caries, sloughing, especially from pressure in exhausting diseases, chronic inflammation of the edge of the eyelids, and in recent burns or scalds combined with linseed oil. Sometimes used in deafness arising from a deficient or unhealthy secretion of wax, mixed with some mild oil and introduced on cotton into the ear. In the form of enema, oil of turpentine has been employed in cases of amenorrhea arising from torpor of the uterine vessels, likewise in obstinate constipation, ascarides, and in tympanitis, or distension of the bowels from accumulations of air, in

which it is a superior remedy. From half a fluidounce to two fluid-ounces may be suspended in half a pint of water, or some mucilaginous liquid, by means of two yolks of egg, injected into the rectum, and retained there for some time.

When given internally, it may be administered on sugar, or in emulsion with gum Arabic, loaf sugar, and cinnamon or mint water; or it may be triturated with the yolk of egg, gradually adding syrup, and essence of cinnamon, with a portion of water. One yolk is sufficient for trituration with every two fluidrachms of the oil. In tapeworm it has been combined with gin, and given in doses of one or two fluidounces. As an ordinary vermifuge, three or four parts of castor oil may be added to one part of the oil of turpentine.

Dr. Jas. Warren has used a preparation for nearly thirty years in the treatment of hemorrhages, with uniform success. It acts both by its sedative power, in diminishing the force of the circulation, and by its astringent qualities, in contact with the bleeding vessels. He is satisfied that no remedy now known exerts a more specific power and more speedy relief, especially in hemoptysis, hematemesis, epistaxis, and menorrhagia. In the treatment of hemorrhage, neither bloodletting, confinement to the room, suppression of the voice, relaxation from business, nor other precautions are necessary; nor is any auxiliary treatment required, except, perhaps, a purgative dose where there is evidence that blood has been swallowed. Exercise in the open air is decidedly preferable to inaction; and wherever there are premonitory symptoms of a return of hemorrhage, it has always exerted a prophylactic power when promptly used; and by this early resort to it, many radical cures have been effected. He terms it "*Styptic Balsam.*" It is made as follows: Place sulphuric acid, five drachms by weight, in a Wedgewood mortar, and slowly add to it, oil of turpentine two fluidrachms, stirring it constantly with the pestle; then add in the same manner Alcohol two fluidrachms, and continue stirring until no more fumes arise, when it may be bottled, and should be stopped with a ground stopper. It should be prepared from the purest materials; and when made should exhibit a dark but clear red color, like dark-blood; but if it be a pale, dirty red, it will be unfit for use. The dose is forty drops, to be used as follows; into a common sized teacup put a teaspoonful of brown sugar, thoroughly incorporate the forty drops by rubbing together, and then slowly stir in water until the cup is nearly full, when it should be immediately swallowed. The dose may be repeated every hour, for three or four hours, and its use should be discontinued as soon as fresh blood ceases to flow. After standing a few days, a pellicle forms upon the surface of the balsam, which should be broken, and the liquid below it used. If in well-stopped bottles, age does not deteriorate it.—*N. Y.*

Jour. Med.

Off. Prep.—Emplastrum Myricæ; Emplastrum Picis Compositum; Enema Terebinthinæ Composita; Linimentum Terebinthinæ; Linimentum Nigrum; Mistura Copaibæ Composita; Mistura Olei Composita; Pilulæ Ferri Compositæ; Tinctura Camphoræ Composita; Unguentum Myricæ; Unguentum Plumbi Compositum; Vinum Phytolacæ Compositum.

OLEUM TIGLII.

Croton Oil.

Nat. Ord.—Euphorbiacæ. *Sex. Syst.*—Monœcia Monadelphia.

THE EXPRESSED OIL OF THE SEEDS OF CROTON TIGLIUM.

Description.—Croton Tiglium is a middle sized tree, the young branches of which are terete, smooth, shining, and somewhat furrowed toward the extremities. The *leaves* are alternate, petiolate, oval-oblong, acute, three to five-nerved at the base, acuminate at the apex, with shallow glandular serratures; thin, membranous, with two glands at their base, covered when young with very minute stellate scattered hairs, dark-green above, and paler beneath. The *petioles* are about one-third the length of the leaf, channeled, having stellate hairs when quite young, but soon losing them. The *flowers* are downy, and arranged in erect, terminal racemes, the male flowers being at the apex, and the female below. The male flowers have a five-cleft calyx, five lanceolate, woolly, straw-colored petals, and fifteen distinct stamens; the females have a five-cleft, permanent calyx, with long and bifid styles. The *fruit* is a smooth, oblong, obtusely triangular capsule, about the size of a hazel-nut, closely covered with minute stellate hairs, three cells, each of which is completely filled with a solitary seed. The skin of the *seeds* is of a pale dull-brown color, and overlays a harder dark integument.

History.—This tree is a native of the East Indies, and is cultivated in some parts of the West Indies. Like the other plants of the family Euphorbiacæ, it is pervaded throughout by an acrid purgative principle. The oil obtained from the seeds is the officinal portion. The seeds are of an ovoid or oblong form, rounded at the extremities, rather larger than a coffee grain, reddish-brown when recent, grayish-brown when old, sometimes brownish black. They consist of a thin, brittle, ligneous shell; a delicate, white, membranous integument; and an oleaginous kernel composed of a pale yellowish-white albumen, and a beautiful embryo, with large, leafy cotyledons. The oil is obtained by depriving the seeds of their shells, bruising them to a pulp, and subjecting the pulp to strong pressure. About fifty per cent. of oil is thus obtained, and ten per cent. more may be removed by digesting the residue with sulphuric ether, filtering, and expelling the ether by a gentle heat. It may likewise be obtained by decoction of the pulp in water. Guibourt

recommends after the first expression, to digest the residue with alcohol at a temperature of 120° to 140° F., and then submit it to a new expression. Distil off the alcohol, and add the oil to the first product. Croton seeds yield upon analysis, a fatty acid called Crotonic acid, fixed oil, resin, traces of a volatile oil, stearin, wax, a magnesian soap with an alkaline reaction, called Crotonin, extractive, sugar, gum, starch, albumen, gluten, lignin, and salts.

Crotonic acid is the supposed active constituent of the seeds, and passes out with the oil either by expression, by ether, or by alcohol. It may be obtained by saponifying the oil with solution of potassa, decomposing the resulting soap by tartaric acid, filtering and distilling the solution, neutralizing the acid product with barytic water, evaporating the solution to dryness, decomposing the barytic salt with strong phosphoric acid, and again distilling. The acid thus obtained is crystalline at 23°, highly volatile, of an acrid taste, intensely irritating to the nostrils, and forms salts with alkaline bases called Crotonates.

The croton oil of commerce is partly imported from India, and partly expressed in England from the imported seeds. It varies in color from a pale amber color to that of deep-colored sherry, has a viscid consistence, like castor oil, which is increased by age, possesses a faint odor, a peculiar, hot, acrid taste, which is very persistent, and is felt most strongly in the back of the palate and throat. It is soluble in sulphuric ether, also in the volatile as well as fixed oils. The English oil is wholly and readily soluble in pure alcohol, forming a permanent solution at ordinary temperatures; the India oil forms an opaque mixture, which becomes clear and uniform upon being heated, but separates on standing into two layers, one of the alcohol somewhat diminished in bulk, the other of the oil, somewhat increased by a retention of part of the alcohol. It is sometimes adulterated with castor oil, which is difficult to detect in the English variety, but may be distinguished in the India oil by shaking the suspected article with absolute alcohol, which will dissolve the castor oil, and have but slight influence on the croton. It is stated that an oil weaker than the genuine croton is obtained from the Barbadoes' nuts, or the seeds of *Jatropha Curcas*; it is an efficient cathartic in a dose of three or four drops. The seeds of the *Croton Pavana* are likewise supposed to furnish some of the croton oil of commerce.

Properties and Uses.—Croton oil is a powerful irritant, and hydragogue cathartic. In large doses it is a dangerous poison, occasioning vomiting, severe griping pain, hypercatharsis, and other serious symptoms. Its action is prompt, frequently causing catharsis within an hour; and on account of its small dose it is especially adapted to cases where medicines requiring large doses cannot be given, as in mania, coma, and with children. A drop placed on the tongue of a comatose patient will generally operate. It is principally employed as a purgative when the

bowels are very torpid ; in comatose diseases as a revellent ; and in dropsy as a hydragogue. It is likewise asserted that, independent of its purgative property, it possesses efficacious influences in epilepsy, neuralgia, and spasm of the glottis. It may be used in all cases where prompt and active purgation is indicated. It is distinguished from other powerful cathartics by occasioning much borborygmus or rumbling of wind, by its action commencing speedily and ending soon, and by the purgative effect, however exhausting at the time, being followed by little debility. Externally, it produces erythematic redness, intense burning, and an eruption of minute vesicles. It should be diluted with three parts of olive oil, camphor liniment, oil of turpentine, or other convenient vehicle, and applied to the skin as a counter-irritant two or three times a day. Used thus it is beneficial in rheumatism, gout, neuralgia, indolent swellings, follicular disease of the throat, and pulmonary affections. The dose of croton oil is from one to six drops, which is best given on sugar, or made into a pill with crumb of bread, in order to avoid the disagreeable acrid sensation it occasions in the throat, with a constant tendency to hawk, as well as to prevent nausea or vomiting. Four drops of the oil, applied externally by friction around the umbilicus, will, it is said, produce catharsis.

Off. Prep.—Ceratum Crotonis ; Pilulæ Gambogiæ Compositæ.

OLIBANUM.

The Frankincense of the Ancients.

Nat. Ord.—Amyridaceæ, Burseraceæ, (*Lindley*) ; Terebinthaceæ, (*De Candolle*). *Sex. Syst.*—Decandria Monogynia.

GUM-RESIN OF BOSWELLIA SERRATA.

Description.—This is the *Boswellia Thurifera* of some botanists ; it is a leafy forest tree growing on the Coromandel coasts and other parts of India. The *leaves* are at the extremity of the branches, pinnate, consisting of about ten pairs of obliquely, oblong, obtuse, serrated, villous leaflets, with a terminal one ; they are sometimes opposite, sometimes alternate, and on short, round, pubescent petioles. The *flowers* are in simple axillary racemes, shorter than the leaves, numerous, small, of a pale pink color, and furnished with minute bracts. The *calyx* is small, downy, and five-cleft ; the *petals* are oblong and spreading, villous externally, and longer than the stamens. *Stamens* are ten, inserted on the outer edge of a cup-shaped torus or nectary, which is crenated and fleshy, surrounding the ovary ; they are alternately shorter, and support oblong anthers. The *ovary* is superior, ovate, and bears a cylindrical style, with three-lobed stigmas. The *fruit* is a three-angled, smooth capsule, having three cells opening by three valves, and each containing

a single seed, which is broad, cordate at base, deeply emarginate, with a long, slender point.

History.—There appear to be two varieties of frankincense, one from the above tree and one from a tree growing in the countries around the Red Sea, and which, it is stated, grows upon bare marble rocks, without any soil or even a fissure to support it, adhering by means of a substance thrown out from the base of the stem. It rises about forty feet, having short branches near the top, covered with a bright-green, singular foliage. Olibanum consists chiefly of yellowish, somewhat translucent, roundish tears, and generally covered with a whitish powder, produced by friction. It has a balsamic, resinous smell, and an acrid, bitterish and somewhat aromatic taste. When triturated with water, it forms an imperfect milky solution. Alcohol dissolves nearly three-fourths of it, forming a transparent tincture. One hundred parts of it contain 8 of a volatile oil resembling that of lemons in color and smell, and which may be separated by distillation; 56 of resin; 30 of gum; 5.2 of a glutinous matter insoluble in water or alcohol, with 0.8 loss.

Properties and Uses.—Olibanum is stimulant, like other gum-resins. Principally used for fumigations, and occasionally enters into some plasters.

ONOSMODIUM VIRGINIANUM.

False Gromwell.

Nat. Ord.—Boraginaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE ROOT AND SEEDS.

Description.—This plant is the *Onosmodium Hispidum*, of Michaux, and the *Lithospermum Virginianum* of Linnæus; it is also known by the common names of *Gravel-weed*, and *Wild Job's Tears*. It is a perennial herb, clothed all over with harsh and rigid appressed bristles; the stems are rather slender, and grow from one to two feet in height. The leaves are oblong, or oblong-lanceolate, often oval, and even ovate-lanceolate, sessile, minutely strigose, three to five-veined, the lower ones narrowed at base, and from an inch to two and a half inches long, by half an inch or three quarters of an inch broad. The flowers are yellowish-white, in terminal leafy racemes, which are recurved at first but finally become erect and elongated. Calyx five-cleft, the lobes lanceolate, pilose on both sides, and half as long as the corolla. Corolla oblong-tubular, with a ventricose, half five-cleft limb, with lance-subulate segments, and clothed externally with long, hispid hairs. Stamens five, with very short flattened filaments supporting included, sagittate, apiculate anthers. Style much exserted, smooth. Achenia ovoid, smooth and shining, fixed by a flat base.

History.—This plant is found growing from New York to Florida, in dry, hilly grounds, flowering from June to September. The root and

seeds are the parts employed, and yield their virtues to water. There are two other species of this genus which possess similar properties. These are the *Onosmodium Carolinianum*, growing in rocky hills and along river banks from New York to Carolina and Tennessee; it grows from one to four feet high, has a stout, upright, soft, white pubescent stem, with stouter and larger leaves than the preceding variety; lobes of the corolla deltoid-ovate, obtusish, more or less hairy on the back; anthers oblong, longer than the narrow filaments, and silky-pubescent.—The other is the *Onosmodium Strigosum*, growing in the Western States, and found abundantly in Tennessee and Illinois in wet prairies and woods, on hill sides, and delighting, as it is said, in rich limestone soils. The stem is erect, simple, pilose-hispid, very leafy; the leaves are sessile, lance-linear, three inches long and one inch wide, three-veined, with appressed hairs, nearly smooth beneath the veins; bracts lance-linear, silky; calyx lobes linear, acute, silky with appressed hairs on both sides, very long; corolla cylindrical, larger than in the last, a third longer than the calyx, silky pubescent outside; anthers linear, much longer than the vertically dilated filaments.

Properties and Uses.—Diuretic and tonic. Said to be a solvent of calculus. A strong infusion of the root and seeds, taken every two hours for twelve or twenty hours, or until it operates as a cathartic, in doses of four fluidounces, is highly extolled as a cure for calculous affections. Care must be taken that it be not continued too long, for fear of producing too great a flow of urine. It is worthy of a full investigation.

ORIGANUM VULGARE.

Origanum.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE HERB.

Description.—*Origanum Vulgare* or *Wild Marjoram* is a perennial herb, with erect, herbaceous, hairy, purplish, quadrangular, trichotomous stems, from six inches to two feet in height. The leaves are opposite, petiolate, broad-ovate, obtuse, subserrate, hirsute, rounded at the base, green on both sides, sprinkled with resinous dots, and paler beneath. The petioles are hairy, and one-fourth as long as the leaves. The flowers are numerous, of a pinkish purple or rose-color, and are disposed in smooth, erect, roundish, paniced, and fasciculate spikes, and accompanied with ovate, reddish bracts, longer than the calyx. The calyx is ovate, tubular, striated, with nearly equal segments, and hairy in the throat. The corolla is funnel-shaped, about the length of the calyx, slightly two-lipped; the upper lip suberect, bifid and obtuse, the lower trifid, blunt, and spreading. Stamens four, exserted, somewhat didynamous, with

double anthers; the *stigma* bifid and reflexed. *Achenia* dry, somewhat smooth.

History.—Wild Marjoram is a native of Europe and America. It is found growing along the road-sides, dry banks, and in dry stony fields and woods, flowering from June to October. The whole plant is officinal, but is principally used for the extraction of its volatile oil, on which its virtues depend and which may be separated by distillation with water. The plant has a strong, peculiar, rather agreeable balsamic odor, and a warm, bitterish, aromatic taste, which properties are imparted to alcohol, or boiling water by infusion.—The *Origanum Majorana*, or Sweet Marjoram, possesses properties similar to the above species. It is a native of Portugal, but cultivated in our gardens, and much used in cookery as a seasoning. Its *leaves* are oval or obovate, obtuse, entire, petiolate, hairy pubescent; the *flowers* pink-colored, in compact, roundish, pedunculate, terminal spikes, with roundish bracts. It flowers a month earlier than the preceding species; its odor is stronger, and more agreeable, and its taste more camphoraceous.

Properties and Uses.—Origanum is gently stimulant, tonic, and emmenagogue. A warm infusion produces diaphoresis, and tends to promote menstruation, when recently suppressed from cold. It is sometimes employed externally in fomentation.

Off. Prep.—Infusum Origani; Linimentum Capsici Compositum; Linimentum Olei Compositum; Linimentum Saponis Camphoratum; Oleum Origani; Tinctura Camphoræ Composita.

ORNUS EUROPÆA.

Manna Tree.

Nat. Ord.—Oleaceæ. *Sex. Syst.*—Diandria Monogynia.

THE CONCRETE JUICE. MANNA.

Description.—The Manna tree, or *Flowering Ash*, is a small tree, usually from twenty to twenty-five feet high, much branched, and covered with a smooth gray bark. The *leaves* are opposite, petiolate, and unequally pinnate, and consist of three or four pairs of *leaflets*, with a terminal one, which are opposite, oblong, or oval, acuminate, obtusely serrate, smooth, hairy at the base of the midrib on the under side, about an inch and a half in length, and of a bright green color; the *petioles* are channeled. The *flowers* are white, and usually expand with the leaves; they grow in dense panicles at the extremities of the young branches, on supra-decompound peduncles. The *calyx* is very short, with four ovate teeth; the *corolla* consists of four linear, lanceolate petals. The *stamens* are two, supporting long, yellow, incumbent anthers. The *ovary* is oval, with a very short style, and a notched stigma.

The *fruit* is a pendulous, compressed samara, containing a single, lanceolate, cylindrical, brown seed.

History. — The manna tree is a native of most parts of Southern Europe, but thrives especially in Calabria and Sicily. The officinal part is the juice of the tree, known in commerce as manna. In Sicily the tree yields manna after its eighth year, and for some ten or twelve subsequent years, when it is cut down, and young sprouts allowed to grow up from the root. The manna exudes spontaneously from the bark, during the hot months, and concretes; but in order to facilitate the process deep longitudinal incisions are made in the bark, on one side of the tree, from which the juice runs out, and speedily thickens. These incisions are made on one side of the trunk during one season; on the other side the next, and so on alternately as long as the trees yield manna. There are several varieties of manna, which chiefly differ from one another in quality according to the season and mode of collection. The Sicily manna is the most esteemed.

The best and purest is the *Flake Manna* or *Manna Cannulata*, the Manna Gerace of the Sicilians; it exudes spontaneously, or by incisions during the hottest and dryest weather in July and August, and is usually collected on straw or clean chips which are stuck into the bark below the incisions, so that the juice may concrete upon them in easily detached stalactites. It is in irregular, unequal pieces, light, rough, brittle, dry, white, or pale yellowish-white, resembling stalactitic masses, about six or seven inches long, and an inch broad, hollowed slightly on the side by which they adhered to the tree, and frequently soiled by adhering fragments of bark or other impurities. They usually vary in length from one to seven inches, and have a crystalline or granular fracture. The next quality is *Common Manna*, or *Manna-in-sorts*, this is collected late in the season when the heat has begun to moderate, and the juice does not so readily concrete, but requires to be further dried in the sun. It is in whitish or yellowish fragments, similar to the flake manna but much smaller, mixed with a soft, viscid, uncrystallized brownish matter, and has a nauseous taste. *Fat Manna* is that collected in the latter part of the season, during cool and wet weather, in which the juice is still less disposed to thicken. It is soft, adhesive, not brittle, of a brown, or yellowish-brown color, and full of impurities.

Manna is produced from several other trees beside the *Ornus Europæa*, belonging to the genera *Ornus* and *Fraxinus*. Among which are more particularly the *O. Rotundifolia*, *F. Excelsior*, and *F. Parviflora*. The *Abies* or *Pinus Larix*, yields a sweet exudation called Briançon manna, but which contains no mannite; the *Hedysarum Alhagi* of Syria, yields the Manna Mereniabin, an inferior manna; the *Larix Cedrus* produces the Manna of Lebanon; the *Tamarix Gallica*, the Manna of Mount Sinai; and the *Eucalyptus Mannifera*, a kind of manna called New Holland manna, containing a saccharine principle, but no mannite.

Manna has a faint, peculiar odor, and a rather pleasant, sweet, somewhat sharp, peculiar taste; in the impure or inferior kinds the taste is also nauseous. When long kept it loses its white color, and gradually changes to a yellowish-red or brown. It softens with the heat of the hand, melts at a temperature somewhat higher, and is inflammable, burning with a blue flame. When pure it is almost wholly soluble in three parts of temperate, and in its own weight of boiling water. A saturated boiling aqueous solution on cooling deposits the manna in partially crystalline masses. It dissolves in eight parts of alcohol, and if a saturated solution be made by heat, on cooling, a deposit of beautiful crystals of manna will ensue. In consequence of its sugar, it is capable of undergoing fermentation. Analysis has found it to consist of mannite, sugar, a yellow, nauseous matter, mucilage, etc. *Mannite* may be obtained by boiling manna in alcohol, allowing the solution to cool, and redissolving the crystalline precipitate, when pure mannite is deposited. It is in white, acicular, four-sided prisms, in radiated tufts. It is sweet, inodorous, soluble in five parts of cold water, less so in alcohol, and not fermentable with yeast. Nitric acid converts it partly into oxalic, and partly into mucic acid. It consists of six equivalents of carbon, seven of hydrogen, and six of oxygen. One or two ounces will, it is stated, act as a gentle laxative. Good manna is seldom counterfeited, though the inferior sorts are, occasionally. A spurious article is said to be made of sugar and honey combined with some mild laxative. The inferior manna is likewise purified so as to resemble the flake variety; but all these frauds are easily detected.

Properties and Uses.—Manna is a gentle laxative. Used for children and pregnant women, also in piles attended with constipation. Usually added to other purgatives to conceal their taste. Dose, one or two ounces, for an adult; from one to four drachms for children. It is usually prescribed with other purgatives, as rhubarb, magnesia, etc., but especially with senna. In large doses it is apt to cause flatulence and griping.

OROBANCHE VIRGINIANA.

Beech Drops.

Nat. Ord.—Orobanchaceae. *Sex. Syst.*—Polyandria Digynia.

THE PLANT.

Description.—This plant is the *Epiphegus Americanus* of Nuttall, the *E. Virginiana* of Barton, and is also known by the name of *Cancer-root*. It is a parasitic growth, with a smooth, fleshy, leafless stem, about a foot, or a foot and a half in height, with slender and irregular branches given off the whole length of it. The root is scaly, and tuberous, covered with stiff, short, and brittle radicles. Instead of leaves it has only a few, scattered, inconspicuous, ovate scales, one at the base of each branch,

of a yellowish or purplish color. The *flowers* are alternate, scattered on each branch, subsessile, the lower perfect and fertile, the upper usually imperfect and abortive. *Calyx* short, five-toothed. *Corolla* of the perfect flowers, two-lipped; the upper lip emarginate, the lower three-toothed; of the imperfect, slender, four-toothed, deciduous, six to eight lines long, curved, whitish and purple; the upper tooth or lip broadest, notched at the apex, arched, not longer than the others. *Stamens* as long as the corolla; *filaments* smooth; *anthers* two-lobed, acute at the base, valveless, dehiscent in the middle. *Stigma* capitate, somewhat emarginate. *Capsule* gibbous, truncate, oblique, one-celled, compressed, half two-valved at the apex, with two approximate placentæ on each. *Seeds* very numerous, straw-colored, *shining*.

History.—This plant is found in all parts of North America, growing upon the roots of beech trees, and flowering in August and September. The whole plant is of a dull-red color, without any verdure. It has a bitter, nauseous, astringent taste, which is diminished by drying. It yields its virtues to water. There are several other species of this genus, which are parasitic, and which possess analogous properties, as the *Orobanche Uniflora*, or one-flowered broomrape, and the *Orobanche Americana*, or American broomrape.

Properties and Uses.—An astringent. Used with benefit in hemorrhages of the bowels and uterus, and in diarrhea. Said to cure cancer, but it possesses no property of the kind. In erysipelas a decoction drank freely, and the parts bathed with it, has effected many cures. As a local application, the decoction or poultice will arrest the tendency of wounds or ulcers to gangrene; a poultice of equal parts of poke, white oak, and beech-drops is very useful in herpetic affections. Also useful as a topical application to obstinate ulcers, aphthous ulcerations, leucorrhea, gleet, etc. Dose, of the powder, from ten to fifteen grains. This plant seems to exert an influence upon the capillary system, somewhat similar to that produced by the tincture of muriate of iron.

ORYZA SATIVA

Rice.

Nat. Ord.—Graminaceæ. *Sex. Syst.*—Hexandria Digynia.

THE SEEDS DEPRIVED OF THEIR HUSKS.

Description.—Rice is an annual plant with a jointed *culm* or *stem*; *leaves* clasping; *panicle* terminal; *glumes* two, one-flowered; *paleæ* two, adhering to the ovary; *stamens* six; *styles* two.

History.—Rice is supposed to have been originally a native of the East Indies, but it is at present cultivated in nearly all parts of the world, where the soil and climate are favorable. The ordinary commercial rice consists of the seeds of the plant divested of their husks. Carolina

rice, on analysis, has been found to consist of 85.07 per cent. of starch, 3.60 of gluten, 0.71 of gum, 0.29 of uncrystallizable sugar, 0.13 of a fixed oil, 4.80 of vegetable fiber, 5.00 of water, and 0.40 of saline substances.

Properties and Uses.—Rice is nutritious; and boiled in water till perfectly soft, is very useful in cases of debilitated stomach or bowels, and diarrhea; it is likewise reputed a valuable article of food to overcome the diarrhea so common to those who for the first time use the river waters of the Western States. It is by some considered injurious to the eyes when used in any quantity, but this is an erroneous opinion, as many nations employ it almost exclusively as a diet, without any such effects. A decoction of rice (*rice-water*) is an excellent soothing and nutritive drink in fevers, and inflammatory diseases of the lungs, stomach, bowels, and kidneys.

OSMORRHIZA LONGISTYLIS.

Sweet Cicely.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This is the *Uraspermum Claytoni* of Nuttall; it has a perennial, thick, fleshy, branching *root*, of an agreeable, aromatic flavor, and an erect, nearly smooth *stem*, branching above, and growing from two to three feet high. The *leaves* are large, decomposed, the ultimate divisions often pinnate; the radical leaves on long, slender petioles, the cauline sessile. The *leaflets* are irregularly divided by clefts and sinuses into lobes and teeth; the lobes broadly ovate, and slightly pubescent. The *flowers* are white, in axillary and terminal umbels, about five-rayed, the central ones barren, and the outer ones fertile. *Calyx-margin* obsolete; *petals* oblong, nearly entire, with a short inflexed point. Involucres of linear bracts longer than the rays. *Style* as long as the villose germ, filiform, erect, deflexed. *Fruit* linear-oblong, about an inch in length, angled, tapering downward into a stalk-like base, contracted at the sides, blackish, and crowned with the persistent styles. *Carpels* with five equal, acute, upwardly bristly ribs; commissure with a deep, bristly channel; intervals without vittæ.

History.—This plant grows in various parts of the United States, in rich moist woods, on the sides of low meadows, on the banks of running streams, and on the borders of low woodlands. It flowers in May and June. The root is the part employed, it has a sweet smell and taste, resembling aniseed, and yields its sensible properties to water or diluted alcohol.

Properties and Uses.—Sweet Cicely is aromatic, stomachic, carminative, and expectorant. Useful in coughs, flatulence, and as a gentle

stimulant tonic to debilitated stomachs; the fresh root may be eaten freely, or it may be used in infusion with brandy or water.

OSMUNDA REGALIS.

Buckhorn Brake.

Nat. Ord.—Filices (*Lindley*); Polypodiaceæ (*Brown*). *Sex. Syst.*—Cryptogamia Filices.

THE ROOT.

Description.—This is the *Osmunda Spectabilis* of Willdenow, often termed *Royal Flowering-Fern*. It has a hard, scaly, tuberous rhizoma, beset with numerous fibers, and having a whitish core in the center. The *fronds* are several, erect, three or four feet high, doubly-pinnate, smooth, bright-green, the primary divisions or *pinnæ* from six to ten, nearly opposite, remote, hardly a span long. The *leaflets* are more numerous, often alternate, sessile or nearly so, oblong, bluntish, entire or obscurely-crenate with one rib, and numerous transverse veins; the base dilated, heart-shaped, or somewhat lobed. Some of the upper leaflets are cut, and as it were partially transmuted into dense clusters or spikes of innumerable, small, light-brown, veiny, globular, two-valved *thecæ* entirely covering the segments; several of the upper divisions of the leaf consisting entirely of such *thecæ*, composing a compound panicle. *Spores* green.

History.—This beautiful fern is found in meadows and low, moist grounds throughout the United States, flowering in June. The main roots or caudex, is the officinal part, it is about two inches long, and somewhat in the shape of a horn. It consists of a number of longitudinal scales, lying over each other, and which have silky, transparent borders, with numerous small fibers or radicles, firmly matted together. It contains an abundance of mucilage, which is extracted by boiling water. The root should be collected in August, or about the latter part of May, and dried with great care, as they are apt to become moldy.

The *Osmunda Cinnamomea*, or Cinnamon-colored Fern, is sometimes used as a substitute for the above, but it is inferior. Its root is similar to that of the above, in shape, but it is considerably larger. When its stems first appear in the spring, they are hairy and of a whitish color, surmounted by the young leaves, curiously rolled up in the form of a scroll, and covered with a downy or wool-like substance.

Properties and Uses.—Mucilaginous, tonic, and styptic. Used in coughs, diarrhea, and dysentery; also used as a tonic during convalescence from exhausting diseases. One root, infused in a pint of hot water for half an hour, will convert the whole into a thick jelly. Very valuable in leucorrhea, and other female weaknesses, and said to be an almost certain cure for rickets, in doses of three drachms of the root,

three times a day. The mucilage mixed with brandy is a popular remedy as an external application for sprains, and weakness of the back. For internal use, the roots may be infused in hot water, sweetened, and ginger, cinnamon, brandy etc., added if not contra-indicated.

OSTRYA VIRGINICA.

Iron Wood.

Nat. Ord.—Cupuliferae. *Sex. Syst.*—Monœcia Polyandria.

THE INNER WOOD.

Description.—This is a small tree from twenty-five to thirty feet in height, remarkable for its fine, narrow, longitudinally divided and brownish bark. The wood is white, hard, and strong. The leaves are oblong-ovate, subcordate, acuminate, unequally serrate, somewhat downy; buds acute. Sterile flowers in cylindrical aments; scales orbicular-ovate acuminate, ciliate, one-flowered; filaments somewhat united irregularly; anthers bearded at the summit. Fertile flowers in pairs, numerous, in a short, oblong, pendulous, loosely imbricated, linear, terminal ament, with small deciduous bracts; scales none, but each flower is inclosed in a membranous sac-like involucre, bristly-hairy at the base, and which enlarges, forming a bladdery closed bag in fruit, these being imbricated to form a sort of strobile appearing like that of the Hop. Ovary two-celled, two-ovuled, crowned with entire and bearded border of the perianth, forming a small and seed-like smooth nut. Styles two, united at the base; nut lance-oblong, somewhat compressed, included in the enlarged, imbricated, bladder-like sac.

History.—This plant, sometimes called *Hop-hornbeam*, *Lever-wood*, etc., is a tree common to the United States, growing in rich woods, and flowering in April and May. The flowers are green and appear with the leaves, and the large and handsome oval-oblong strobiles are matured in August. The inner wood and bark, are the parts used; they are bitter, and yield their virtues to water. There is another tree, known as *Iron-wood* closely resembling the above, the *Carpinus Americana*; it grows from ten to twenty feet high, has a smooth gray bark, with an irregularly ridged trunk, and very fine-grained, compact, white wood. The scales of the fertile aments are three-parted, the middle segment being much the largest, oblique, with a lateral tooth, persistent, and becoming foliaceous. The nut small, ovoid, bony, ribbed, with a simple, one-sided, enlarged, and open leaf-like involucre. This tree is not bitter, and must not be confounded with the *Ostrya*.

Properties and Uses.—Iron-wood is antiperiodic, tonic, and alterative, It has been used with efficacy in intermittent fevers, neuralgic affections, dyspepsia, scrofula, and all diseases where an antiperiodic-tonic is indicated. Dose of the decoction, one or two fluidounces, three or four times a day.

OVUM.

Egg.

THE EGG OF PHASANIUS GALLUS.

History.—The *Common Hen*, *Phasianus Gallus*, supposed to have been originally the Jungle-fowl of India, is domesticated in nearly all parts of the globe. Its egg is the officinal product. It consists of an external shell, *testa ovi* or *putamen ovi*, composed chiefly of carbonate of lime, from which nearly pure lime is had by calcination; a lining membrane of an albuminous nature; the white, and the yelk.

The white, *albumen ovi*, is a glairy, colorless, transparent liquid inclosed in delicate membranous cells, inodorous, tasteless, and composed of twelve per cent. of albumen, 2.7 of mucus, 0.3 of saline substances with traces of sulphur, and eighty-five of water. It is soluble in water, coagulable by alcohol, the stronger acids, and by a heat of 160° F., and precipitated by corrosive sublimate, chloride of tin, chloride of gold, subacetate of lead, sulphate of copper, and tannin. Exposed in thin layers to a current of air, it becomes solid, retaining its transparency and solubility in water, and can be thus preserved a long time without change; in this state, it may be applied in a state of solution to the same purposes as in its original condition. It soon putrefies when kept in the fluid state.

The yelk, *vitellus ovi*, is a thick, opaque, yellow fluid, inodorous, of a bland, oily taste, and when agitated with water forms an opaque emulsion. When heated it is converted into a granular solid, from which a fixed oil may be obtained by expression. It contains 51.846 per cent. of water, 15.760 of *vitellin*, a peculiar albuminous principle, 21.304 of margarin and olein, 0.438 of cholesterin, 7.226 of oleic and margaric acids, 1.200 of phosphoglyceric acid, 0.034 of muriate of ammonia, 0.277 of chlorides of sodium, potassium, and sulphate of potassa, 1.022 of phosphates of lime and magnesia, 0.400 of animal extract, and 0.553 of coloring matter, traces of iron, lactic acid, etc.

Properties and Uses.—Eggs are much employed in medicine and pharmacy. The *shells*, powdered and levigated, may be used in the same doses as prepared chalk, as an antacid in diarrhea. The *white of egg* is useful as a demulcent in diseases of the intestinal mucous membrane, and as an antidote for corrosive sublimate and the soluble salts of copper, with which it forms insoluble and comparatively inert compounds. In cases of redness or excoriation from pressure, it forms a good local application, used in the form of a liniment, made by agitating it briskly with its own volume of alcohol. It is used also for the clarification of liquids, which it accomplishes by undergoing coagulation, and enveloping suspended impurities in its flakes; for the suspension of insoluble substances in water; and for forming an astringent poultice, by being

agitated with a lump of alum; the coagulum thus produced is applied, between folds of gauze, over the eye in some forms of ophthalmia.

The *yelk* when raw is considered laxative, and is a popular remedy in jaundice, and dyspepsia; probably, its effects in these complaints are owing to its easiness of digestion. It is mildly nutritious, and generally acceptable to the stomach, and may be used in dyspepsia, beaten up with water and a little ginger. It answers a better purpose than the white, in preparing emulsions and mixtures, being highly useful as an intermediate between water and balsams, turpentine, oils, and other insoluble substances. The oil expressed from the coagulated yelk is sometimes used as an application to excoriated nipples. A non-collegiate practitioner in this county, has acquired some celebrity in the treatment of dyspepsia, loss of appetite, constipation, hemorrhoids, etc.; the agent he employs is a powder composed of equal parts of the inner skin of chickens' gizzards (*ingluvies pulli*,) dried and pulverized, sulphur, and resin, of which from five to ten grains are to be taken three or four times a day.

Off. Prep.—Linimentum Terebinthinæ.

OXALIS ACETOSELLA.

Wood Sorrel.

Nat. Ord.—Oxalidaceæ. *Sex. Syst.*—Decandria Pentagynia.

THE WHOLE HERB.

Description.—Wood-Sorrel is a small, perennial, herbaceous, stemless plant, with a creeping and scaly-toothed *root-stock*. The *leaves* are numerous, radical, palmately three-foliate, on long, weak, hairy stalks; the *leaflets* are broadly obcordate, with rounded lobes, entire, pubescent, of a yellowish-green color, but frequently purplish beneath; they close and droop at nightfall. *Scape* longer than the petioles, one-flowered, with two scaly bracts near the middle. *Flowers* white, yellowish at the base, delicately veined with purple, scentless. *Stamens* ten, monadelphous at the base, alternately shorter; *sepals* five, persistent; *petals* five; *style* as long as the inner stamens. *Capsule* five-lobed, five-celled, oblong; *seeds* several, with an elastic testa.

History.—This plant grows in Europe and North America, in woods, groves, and hedges, but principally confined, in America, to the boreal and mountainous regions. It flowers in May, and is the Shamrock of the Irish. It is without smell, and has an agreeable, acid taste. It owes its acidity to *binoxalate of potassa*, which is sometimes prepared and sold under the name of *Salt of Sorrel*. This comes from Switzerland and Germany, where it is prepared from different species of oxalis and rumex. The following process is employed: The plants previously

bruised are macerated for some days in water, and then submitted to pressure. The liquid thus obtained is mixed with clay, and occasionally agitated for two days. At the end of this time, the clear liquor is decanted, and evaporated so that crystals may form when it cools. These are purified by solution and a new crystallization. Five hundred parts of the plant afford four parts of the acidulous salt. The same salt may be prepared by cautiously dropping a solution of potassa into a saturated solution of oxalic acid. The binoxalate crystallizes when a sufficient quantity of the alkali has been added. It is in rhomboidal crystals, of a sour, pungent, bitterish taste, soluble in ten times their weight of boiling water, much less so in cold water, and unalterable in the air. It is employed for removing iron-mold and ink stains from linen, and sometimes as a test for lime. It contains 72.48 parts or two equivalents of oxalic acid, 47.5 parts or one equivalent of potassa, and eighteen parts or two equivalents of water.

The *Quadroxalate of Potassa*, or *Essential Salt of Lemons* is often substituted for the binoxalate. It is prepared in the same manner, except that, instead of one part, three parts of the acid are added to the original portion neutralized by the potassa. Used for the same purposes as the binoxalate; both are poisonous, though in a less degree than uncombined oxalic acid.—*U. S. Dis.*

There are other varieties of this plant, possessing analogous properties, as the *Oxalis Stricta*, and *O. Violacea*. They all have ternate leaves with obcordate leaflets, and with the exception of *O. Violacea* bear yellow flowers.

Properties and Uses.—This and other species of Sorrel are refrigerant and diuretic. Useful in febrile diseases, hemorrhages, gonorrhea, chronic catarrh, urinary affections, and in scurvy. An infusion, or a whey made by boiling them in milk, may be used, or the herb may be eaten, but in neither case to excess, on account of the oxalic acid they contain. Externally, the bruised leaves, or inspissated juice have been found useful as an application to scrofulous, malignant and indolent ulcers. The *Rumex Acetosa*, or Garden Sorrel, *R. Acetosella*, or Sheep Sorrel, and *R. Vesicarius* possess similar properties, which see.

PÆONIA OFFICINALIS.

Peony.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Digynia.

THE ROOT.

Description.—Peony has many, thick, long, spreading, perennial roots, running deep into the ground, with an erect, herbaceous, large, green and branching stem, about two or three feet high. The leaves are large;

the lower leaves bipinnately divided; the *leaflets* are ovate-lanceolate, smooth, variously incised. The *flowers* are large, red, terminal, solitary; *sepals* five, unequal; *petals* red, cordiform; *stamens* numerous, mostly changed to petals by cultivation. *Carpels* three; *stigmas* double, persistent; *follicles* fleshy, many-seeded; *seeds* black, numerous, dry, round.

History.—This is a native of southern Europe, and is cultivated in gardens in the United States and elsewhere, on account of the beauty of its flowers, which appear from May to August. The *root* is the official part; it consists of a caudex about as thick as the thumb, sending off spindle-shaped tubers in all directions, which gradually taper into thread-like fibers. It, together with the seeds, have when recent, a strong, peculiar, disagreeable odor, and a nauseous, sweetish taste, succeeded by bitterness, acidity, and slight astringency; on drying it nearly loses its odor, and its taste is lessened. The flowers have a similar odor, and an astringent, sweetish, herbaceous taste. They all yield their virtues to diluted spirits. No analysis has been made of this plant.

Properties and Uses.—Peony is antispasmodic and tonic. It has been successfully employed in chorea, epilepsy, spasms, and various nervous affections. In combination with white snakeroot, or black cohosh, it has proved valuable in pertussis. An infusion may be made by adding an ounce of the root in coarse powder to a pint of a boiling liquid, composed of one part of good gin, and two parts of water, which may be sweetened; dose two or three fluidounces three or four times a day. Dose of the expressed juice of the recent root, one or two drachms; of the powdered root, a drachm three or four times a day; of the powdered seeds from thirty to forty grains. The seeds taken night and morning, have been successfully used in removing the nightmare, attendant upon dropsical persons; they are also reputed emetic, cathartic, and antispasmodic.

PANAX QUINQUEFOLIUM.

Ginseng.

Nat. Ord.—Araliaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—Ginseng has a perennial, fusiform, whitish, thick and fleshy *root* transversely wrinkled, and terminating in fibers; its upper portion slender and marked with the scars of former shoots. The *stem* is round, smooth, green, often with a tinge of red, about a foot high, regularly divided at top into three petioles, with a flower-stalk in their center. *Petioles* round, smooth, swelling at base. The *leaves* are three, ternate, quinate or septenate. *Leaflets* pedicellate, obovate, sharply serrate, acuminate, smooth on both sides, with scattered bristles on the

veins above. The *flowers* are small, greenish, and arranged in a simple umbel, supported by a round, slender peduncle, which rises from the top of the stem in the center of the petioles. *Involucre* of a multitude of short subulate bracts, interspersed among the flower-stalks, which are so short as to give the appearance of a head rather than an umbel. *Calyx* with five small acute teeth. *Petals* five, oval, reflexed and deciduous. *Stamens* five, with oblong anthers. *Styles* two, reflexed, persistent. *Ovary* large, inferior, ovate-cordate, compressed. *Berries* kidney-shaped, retuse at both ends, compressed, of a bright scarlet color, crowned with the calyx and styles, and containing two and sometimes three semicircular seeds. The outermost florets ripen first, and their berries often obtain their full size before the central ones are expanded, the central florets are frequently abortive.

History.—Ginseng is a native of most of the Middle and Northern States, and extends on the mountains far south, growing in rich soil and in shaded situations, and flowering in May. The root is somewhat spindle-shaped, from one to three inches long, about as thick as the little finger, and terminated by several slender fibers. When dried, it is yellowish-white and wrinkled externally, internally a hard central portion, surrounded by a soft whitish bark; it has a feeble odor, and a sweet, pleasant bitter, slightly aromatic taste, and yields its properties to water or alcohol.

Properties and Uses.—A mild tonic and stimulant. Useful in loss of appetite, slight nervous debility, and weak stomach. By some, it is considered useful in asthma, gravel, convulsions, paralysis, to invigorate the virile powers, etc., etc. Dose of the powder, from ten to sixty grains; of the infusion, from two to four fluidounces.

PAPAYER SOMNIFERUM.

Poppy.

Nat. Ord.—Papaveraceæ. *Sex. Syst.*—Polyandria Monogynia.

THE CONCRETE JUICE OF THE UNRIPE CAPSULES. OPIUM.

Description.—The Poppy is an annual plant, with a tapering and white root; the stem is round, erect, smooth, glaucous, often branched, leafy, and from two to four feet in height; sometimes there are a few rigid hairs on the upper part of the stem. The leaves are large, alternate, ovate-oblong, incised and dentate, repand, amplexicaul. The flowers are large, terminal, white or silvery-gray, on long peduncles. The calyx is smooth, and consists of two ovate, concave, obtuse, sepals, which fall off on the expanding of the flower; the corolla consists of four, roundish, spreading, undulated, and as it were, plaited petals, white with a violet spot at base. The stamens are very numerous, much shorter than the corolla, and terminated by oblong, compressed anthers. The ovary is

nearly globular, smooth, crowned with a flat, stellate stigma. The *capsule* is large, smooth, one-celled, but with partial dissepiments. The *seeds* are very numerous, small, of a whitish or gray color, somewhat reniform, escaping at maturity by openings under the stigma; they are oily and destitute of any narcotic power.

History.—There are several varieties of this species, the most prominent of which are termed the White and the Black Poppy. The *white*, *Papaver Somniferum*, has white flowers and seeds, and ovate capsules with no seed openings; the *black*, *P. Officinale* has colored flowers, dark seeds, and large globular capsules, with openings for the discharge of the seeds under the stigma. However distinct these may be naturally, by cultivation they run into each other, and seeds from the same capsule will furnish plants bearing flowers of different colors. The white poppy is generally described as the officinal opium plant, and is commonly supposed to be a native of Persia, though found growing wild in the South of Europe. At present it is extensively cultivated in India, Egypt, Turkey, and several parts of Europe, on account of its seed, capsules, and opium. In this country it is found only as a garden plant, although there is every reason to believe that it would prove a very lucrative branch of industry, not only from the opium it yields, but also from the oil to be had from its seeds, which is an excellent substitute for olive oil. In India the flowers appear in February; in Europe and the United States from May to September. The officinal parts of the plant are the capsules, and opium, or the concrete juice from the capsules; the seeds are employed for obtaining their oil.

The *capsules* of the poppy, or *poppy-heads*, should always be gathered before they have ripened; at this time they abound in the juice from which opium is formed, which in a great measure disappears on the ripening of the capsule. When dried, the unripe capsules possess the peculiar bitterness and narcotic qualities of opium, which is scarcely perceptible in those that have been suffered to come to maturity. The dried capsules are of various sizes, from that of a small egg to that of a large orange, they are of an ovate or globular form, flattened below, and surmounted by the persistent stigma. The capsules of the white poppy are larger than those of the black. They owe their virtues entirely to the opium contained in them. *Poppy seeds* are very numerous, a single capsule containing from 10,000 to 30,000. They are oleaginous and emulsive, and yield by expression a large quantity of a yellowish fixed oil, which, on being exposed for some time to the air, dries up into a varnish. The oil obtained is from one quarter to one half the weight of the seeds. It, together with the seeds, is inodorous, and has a bland and pleasant taste, without any narcotic properties. The oil is light, and transparent, and is used as food, likewise for painting, for burning, and for the manufacture of soap.

Opium is procured from the unripe capsules. The whole plant is said to contain a white, opaque, narcotic juice, but in less quantity than the capsules. The mode of procuring it is as follows: A few days after the flowers have fallen, horizontal incisions are made in the capsule, care being taken not to penetrate its cavity; a white, milky fluid exudes, which is left for twenty-four hours, and then scraped off with large dull knives; each capsule furnishes but a few grains of opium. The epidermis of the capsule is likewise removed by the process of scraping, and constitutes about one-twelfth of the whole product. The opium is now in the form of a glutinous, granular jelly, and is transferred into small earthen vessels, where it is beaten, and at the same time, moistened occasionally with saliva. It is then wrapped in dry leaves for sale. The extraction of the opium from the capsules does not injure the seeds. In different countries, the mode of collecting the opium varies, in some, the incisions are made transversely, but in all, the essential steps are nearly similar. An inspection of the various kinds of opium, would indicate a difference in the mode of extraction, as well as in its subsequent manipulations. Sometimes it consists of small tears or drops, which appear to have undergone no other process after collection than agglutination; again, it is found composed of thin layers, partially inspissated on poppy leaves, and afterward united along with the leaves into roundish masses; and that of Egypt, Hindostan, and Europe is quite homogeneous.

The supply of opium, in commerce, is chiefly obtained from Persia, Hindostan, Egypt, and Asiatic Turkey. That from Turkey is the most esteemed, and is the kind principally used in the United States. It is imported direct from Smyrna, or indirectly through various European ports. Turkey opium is prepared in Anatolia; it usually comes to us in more or less flattened masses, of irregular size and shape, covered with leaves, or the remains of leaves and with the reddish capsules of some species of *Rumex*, which are said to be absent in the inferior kinds. There are several varieties of it, among which we may refer to the Smyrna and Constantinople opium. The *Smyrna opium* is imported in lumps weighing from half a pound to a pound, and occasionally two or three pounds, and is of various shapes, owing probably to the pressure they receive, while yet soft, in the cases which contain them; sometimes they are found in flat cakes. Internally, they are still soft when found in the market; externally they are hard, and covered with the reddish capsules of a species of *Rumex* to prevent their surfaces from adhering, and sometimes with the remains of leaves. Their substance is rather pale-brown, and consists of minute agglutinated scales or tears, and are undoubtedly formed from the juice which escapes in drops from the incisions in the capsules, and is allowed to concrete before collecting them. In the finer kinds, the only impurities present, are fragments of the capsules. This variety of opium is the most abundant in our markets, and is the best opium met with; it is more productive in morphia than any other, yielding

from 9 to 11 per cent. There is an inferior article, or *Common Smyrna Opium*, of the form and size of the previous kind; it is commonly covered with poppy leaves, and often with rumex capsules; it is harder because older; it has a darker color, sometimes brownish-black internally, at times a musty smell, with more or less moldiness. It is sometimes homogeneous, and again appears to be composed of thin layers with interposed poppy leaves. This variety is less productive of morphia than the preceding, and is likewise more liable to adulteration.

Constantinople Opium is met with in flat, roundish masses, from half a pound to two and a half pounds in weight, and in its exterior appearance very much resembles the superior Smyrna variety. It differs, however, in its interior constitution, being for the most part, dry, hard, pale-brown, and homogeneous in texture, or rather composed, as it were, of agglutinated scales, owing, probably, to its being removed from the capsules before concretion, or to its being subsequently subjected to pressure. In point of purity, it is about equal to the Smyrna drug. It is only occasionally met with in commerce.

Other varieties, as Egyptian, India, and Persian Opium are occasionally met with. The *Egyptian* variety has been largely imported, but of late is gradually disappearing from our markets. It is in round flattened cakes, of various dimensions, weighing from four to eight ounces, and sometimes a pound. It is wrapped up in a poppy leaf, is dry, hard, and brittle, has a pale-brown color and conchoidal, waxy fracture, with an odor weaker than the Smyrna opium. It is always destitute of the Rumex capsules. It is inferior to the Turkey opium, though occasionally parcels are met with as rich in morphia, but the quality is by no means uniform. It is probably adulterated in its preparation, and should never be employed in the preparation of tinctures, or for filling the prescriptions of physicians. The *India* or *East India Opium*, very seldom reaches our markets; a greater abundance of it is made than of any other kind of opium, and in the East it commands high prices, though inferior to Turkey opium. There are two chief varieties of it, the Bengal, and the Malwah opium. The *Bengal Opium* is produced in Bahar and Benares; it is in round balls, weighing three pounds and a half, invested by a coating or case about half an inch thick, and half a pound in weight, formed of tobacco-leaves and agglutinated poppy capsules. Its interior is brownish-black, of the consistence of stiff paste, and has the characteristic odor and taste of opium. This is an inferior opium, yielding about 4 or 5 per cent. of morphia, and is not only subject to adulteration, but is injured, in consequence of the juice being kept until fermentation takes place, before it is made up. Another variety of Bengal Opium, is called *Garden Patna Opium*; it is prepared in Bahar with much care, from juice which has not been allowed to ferment. It is in cakes about three or four inches square, and about half an inch thick, weighing four ounces, and is neatly packed in cases

with a partition of mica between each cake. The cakes are without covering, hard, dry, brittle, of a uniform fracture, light-brown, and sometimes almost black, very much resembling the Egyptian Opium. They are superior to the preceding Bengal Opium, and some specimens are little inferior to average Turkey Opium in their proportion of morphia. This opium is never imported as an article of trade. *Malwah Opium* is in flat, roundish cakes, five or six inches in diameter, and from four to eight ounces in weight. They are commonly quite hard, dry, brittle, almost pulverizable, of a light-brown color, a shining fracture, a compact homogeneous texture, free from mechanical impurities, and frequently presenting cracks near their circumference. It is superior to the common Bengal Opium, and is not met with in this country.

Persian Opium has occasionally found its way into our markets, but it is very rare. It is in cylindrical sticks five or six inches long, and about half an inch thick, wrapped in glossy paper, and tied with a cotton thread. It is soft and flexible, of uniform consistence, does not harden when kept for years, is of a paler-brown color than any other kind, and its texture, under the microscope, is distinctly granular, as if it were composed of agglutinated tears. It is of inferior quality. But it is not in Asia alone that Opium has been collected; many successful attempts have been made in England and other parts of Europe; and although the culture of the poppy has been limited in these places, yet opium has been prepared fully equal to the Turkey drug, and at a much cheaper rate.

Opium, when of good quality, has a strong, very peculiar, narcotic odor, with a most intense and persistent bitter taste, somewhat aromatic and acrid. Its color is deep reddish-brown or deep fawn, its texture compact, and its specific gravity 1.336. The only change that good opium undergoes by keeping, is that of gradually becoming hard; the inferior varieties, are very apt to become moldy after a time. Persons unaccustomed to its use will often have their mouths blistered by chewing it, and it is very apt to excite more or less irritation in the lips and tongue. When soft, as it is usually in the center of the mass, it is tenacious, and on exposure to the air gradually hardens, and ultimately becomes brittle, breaking with a shining fracture, and giving a yellowish-brown powder, when pulverized, which is very apt to cohere. Upon the application of a gentle heat it softens and becomes adhesive, and at a higher temperature it burns, evolving peculiar odorous fumes. Water, cold or warm, dissolves about two-thirds of it, including a great part of its active ingredients, and forms a deep reddish-brown infusion; the residuum consists chiefly of a substance analogous to caoutchouc, with a considerable portion of narcotin. Alcohol dissolves nearly four-fifths of its weight, and the whole of its active parts. Sulphuric ether chiefly dissolves narcotin, which may be obtained in fine crystals on evaporation. The concentrated mineral acids disorganize opium; but the

diluted acids, both mineral and vegetable, are powerful solvents, and exhaust it entirely of its active principles.

Probably, no drug has more engaged the attention of chemists than this; but notwithstanding the many investigations of it, nothing of importance was developed until 1803 when Derosne made known the existence of a crystallizable substance which he had discovered in opium; and which was subsequently termed narcotin; in the year following, Seguin discovered another crystallizable body, but did not fully investigate its nature. In 1817 Sertuerner announced the discovery of morphia and meconic acid, since which later experimenters have demonstrated that this drug is complex in its composition, containing no less than seventeen or eighteen constituents. It contains morphia, which is its most important principle, narcotin, codeia, paramorphia, narcein, meconin, porphyroxin, meconic and sulphuric acids, a peculiar acid not yet fully investigated, extractive matter, gum, bassorin, a peculiar resinous body insoluble in ether and containing nitrogen, fixed oil, a substance resembling caoutchouc, an odorous volatile principle, lignin, a small proportion of acetic acid, sulphate of lime, sulphate of potassa, alumina, and iron, and also what appears to be only an occasional constituent, termed by Pelletier, pseudomorphia, beside papaverina discovered by Dr. G. Merck.

Inferior opium has a blackish color, a weak or empyreumatic smell, a sweet or slightly nauseous and bitter taste; a soft, viscid, or greasy consistence, and a dull fracture; or it may possess an irregular, heterogeneous texture, arising from foreign impurities. It should not color the saliva deep brown, nor leave a dark uniform trace when drawn over paper, nor form with water a thick viscid solution. When drawn over paper, good opium usually leaves an interrupted trace of a light-brown color.

All the substances which cause precipitates with opium do not necessarily affect its medical virtues; but those agents which are strictly *incompatible*, are all vegetable infusions containing tannic or gallic acids, which separate and precipitate its active principle, and also the alkalies or their solutions.

Opium is very subject to adulterations, which are practiced before it is imported into this country. Sand, dust, stones, oil, extract of poppy, and various other substances are employed for the purpose. Some of these impurities can be detected by ocular inspection, but others are more difficult to distinguish. Many purchasers rely almost entirely on external characters, as color, odor, taste, texture, moisture, and freedom from mechanical admixtures; but these constitute fallacious criterions. Meconic acid and morphia, have, thus far, been found only in the products of the poppy—hence, the presence of these agents will prove the existence of opium in any suspected mass, although it will not determine its quality. Meconic acid may be ascertained by forming an aqueous infusion of the substance to be examined, and adding to it the tincture

of chloride of iron, if the solution become changed to a red color, this acid is probably present. The matter may be rendered more certain by the following process: Add to the filtered infusion an excess of a solution of acetate of lead; if opium be present, there will be a precipitate of meconate of lead, and the acetates of morphia and lead will remain in solution. Suspend the precipitate in water, and decompose it, either by adding a little diluted sulphuric acid, which forms the sulphate of lead, and leaves the meconic acid in solution; or, by passing through it a stream of sulphureted hydrogen, removing the precipitated sulphuret of lead by filtration, and heating the clear liquor so as to drive off the sulphureted hydrogen. If meconic acid be present, the clear liquor thus obtained, will yield a red color with tincture of muriate of iron, a green precipitate with the ammoniated sulphate of copper, and white precipitates soluble in nitric acid, with acetate of lead, nitrate of silver, and chloride of barium. To ascertain the presence of morphia, take the above liquid after the sulphureted hydrogen has been driven off by heat, and apply the following reagents: *Nitric acid*, colors it red if morphia be present; *iodic acid*, which is decomposed by the morphia with the extrication of iodine, colors the liquid reddish-brown, and, if starch be present, unites with it to form a blue compound; *tannic acid*, precipitates an insoluble tannate of morphia; *solution of ammonia*, carefully added so as not to be in excess, throws down a precipitate of morphia, soluble in a great excess of that alkali, or of potassa; and if the precipitate afford a deep-red color becoming yellow, with nitric acid, and a blue color with the sesquichloride of iron, the proof is complete. Having now ascertained that opium is present in the mass under examination, the next thing is to ascertain its quality, and this can only be done by extracting its morphia; the proportion of morphia obtained is the best test of its purity. Good opium should yield at least ten per cent. of morphia, according to the processes named under the head of *Morphia*, which see. The Edinburgh College gives the following test: "A solution from 100 grains of fine opium macerated twenty-four hours in two fluidounces of water, filtered and strongly squeezed in a cloth, if treated with a cold solution of half an ounce of carbonate of soda in two waters, yields a precipitate which weighs when dry, at least ten grains, and dissolves entirely in solution of oxalic acid."

The following is Guilliermond's test of the quality of opium, as ascertained by its amount of morphia: "Take 15 parts of opium, cut in pieces, rub it up with 60 parts of alcohol at 160°, drain the mixture on linen and express, treat the residue with 40 parts of alcohol at the same temperature, unite the tinctures in a vessel with a large mouth into which 4 parts of solution of ammonia (22° Cartier), have been introduced, and allow the mixture to stand 12 hours. The crystals which form are to be put upon linen, washed repeatedly with water to separate the meconate of ammonia, and then introduced into a small vessel of

water. The crystals of narcotina being very light, remain suspended in the water, and may be decanted along with it, while those of morphia remaining at the bottom, may be collected and weighed. Good opium treated in this way will yield for the 15 parts employed from 1.25 to 1.75 parts of the crystals of morphia." As these crystals are not quite free from narcotina, M. de Vry proposes the following modification: "The mixture of morphia and narcotina, precipitated from the alcoholic solution by ammonia, after being washed, is to be heated with a slight excess of sulphate of copper dissolved in pure water. The narcotina has no action on the sulphate of copper, which is decomposed by the morphia, producing sulphate of morphia and tribasic sulphate of copper. The latter and the narcotina remain undissolved, and a solution is obtained containing sulphate of morphia with a little sulphate of copper. This being filtered is treated first with sulphureted hydrogen, which precipitates the copper, and afterward with ammonia, which throws down the morphia.

Morphia and some of its salts are treated of under another head,—see part III, *Morphia*. *Narcotin* or *Narcotina*, is considered alkaline by some who bestow upon it the latter name, and others who view it as a neutral principle, give it the former term. It may be obtained from opium exhausted in water, by macerating it with diluted acetic or pyroligneous acid, filtering the solution and decomposing it with potassa, washing the precipitate with water, and purifying it by solution in boiling alcohol, from which it crystallizes as the liquid cools. Should it still be impure, the solution in alcohol and crystallization may be repeated several times if necessary. *Narcotina* may likewise be obtained by digesting opium in sulphuric ether, and as the ethereal solution is slowly evaporated, crystals of narcotina are deposited. It is white, tasteless, and inodorous; it crystallizes from alcohol in thin, unequally-beveled pearly tables, but in regular rhombic prisms from ether; is insoluble in cold water, soluble in 400 parts of boiling water, in 100 parts of cold and 24 of boiling alcohol which deposits it upon cooling, soluble in ether, diluted acids, fixed and volatile oils, and insoluble in solution of potassa. At a moderate temperature it is fusible, being converted into a resinous-like substance, and when pure it is incapable of forming a yellow solution with nitric acid, or a blue one with sesquichloride of iron. It unites with acids forming definite compounds, some of which are crystallizable, but does not prevent them from reddening litmus paper. Its salts are very bitter, and their solution reddens litmus paper. *Narcotina* consists of nitrogen, carbon, hydrogen and oxygen; its received formula is $\text{NC}_{18}\text{H}_{24}\text{O}_{15}$. Its effects upon the system are but very imperfectly known. One grain dissolved in oil threw a dog into a state of stupor terminating in death in the course of twenty-four hours. Acetic acid is said to modify its action, also nitric and muriatic acids. Twenty-four grains dissolved in vinegar will not destroy a dog; thirty grains similarly dissolved exerted

no influence upon several patients to whom this dose was given. Thirty or forty grains dissolved in acetic or sulphuric acid, or in olive oil, proves fatal to dogs, but not when put in nitric or muriatic acid. It has been highly recommended as an antiperiodic; three grains to be given as a dose, in a solution of muriatic acid, and repeated three times a day; it is said to prove sudorific, and never to occasion distressing headache and restlessness, as is sometimes the case with quinia.

Codeia was discovered by Robiquet, in 1832. It exists in opium combined with meconic acid, and is extracted with the morphia in the preparation of the muriate. When the liquor containing the mixed muriates of morphia and codeia is treated with ammonia, the morphia is precipitated, and the codeia remains in the liquid, from which it may be obtained by evaporation and crystallization. It may then be purified by dissolving the crystals in hot ether, and evaporating. It may likewise be separated from morphia by a solution of soda or potassa, which dissolves the morphia and leaves the codeia. Codeia forms in colorless octahedral crystals. It is soluble in alcohol, ether and in water, which takes up 1.26 per cent. at 60°, 3.7 at 110°, and 5.9 at 212°. When added to boiling water in excess, the undissolved portion melts and sinks to the bottom, looking like oil. It melts at 300° without decomposition. It has an alkaline reaction on test-paper, forms salts with the acids, some of which are crystallizable, and does not become changed to a red color with nitric acid, nor to a blue with the salts of sesquioxide of iron. Tannic acid precipitates it from its solutions, forming a tannate of codeia. It consists of nitrogen, carbon, hydrogen, and oxygen, its received formula being $\text{NC}_{35} \text{H}_{20} \text{O}_5$. In doses of one or two grains, it acts on the nervous system, directing its influence apparently to the great sympathetic, relieving painful disorders which seem to have originated from this nerve, but producing no effect upon pains of parts receiving a supply of nerves from the spinal marrow. It does not affect the circulation, disturb digestion, nor cause constipation. The nitrate of codeia in doses of four or six grains acts as an excitant, accelerating the pulse, increasing the temperature of the head and face, with itching of the skin, and a species of intoxication, followed after a lapse of several hours, with an unpleasant depression, nausea, and sometimes vomiting. Like narcotina its influence upon the system is imperfectly known.

Paramorphia was discovered by Pelletier. It is prepared by treating an infusion of opium with milk of lime; the resulting precipitate must be washed with water till the liquid comes away colorless. Then treat with alcohol, which, instead of taking up morphia, yields a new alkaline principle, which may be obtained by evaporating the alcohol, dissolving the residue with ether, and allowing the ethereal solution to evaporate spontaneously. The resulting crystalline mass must, in order to purify it, be dissolved in an acid, precipitated by ammonia, and recrystallized by means of alcohol or ether. Paramorphia is white, crystallizes in

grains from alcohol, and in very oblique prisms from ether, has an acrid, styptic taste, is hardly soluble in water, very soluble in alcohol or ether, fuses at 266° , and combines with acids forming uncrystallizable salts. Alkaline solutions do not dissolve it, but precipitate it from its acid solutions. Nitric acid does not redden it, nor the salts of sesquioxide of iron change it to a blue color. It may be distinguished from codeia, by never being in large crystals, by its not forming crystallizable salts with acids, being always precipitated from its acid solutions by ammonia, and by not melting in oily drops. It differs from narcotina, in having shorter crystals which lack the pearl-like appearance of those of that alkali, in tasting differently, in being much more soluble in cold alcohol, and in the action of nitric acid upon it, which converts it into a resinous-like matter before dissolving it, while the same acid instantly dissolves narcotina. The same elements are found in its composition as in the two previous principles; its formula is $\text{NC}_{25} \text{H}_{14} \text{O}_3$. The term *Thebain* has been proposed for it. One grain of it has produced tetanic spasms, and it appears to produce effects analogous to those of strychnia and brucia.

Narcein was discovered by Pelletier in 1832. He obtained it by treating an aqueous extract of opium with distilled water, precipitating the morphia by ammonia, concentrating the solution and filtering it, precipitating the meconic acid by baryta water, separating the excess of baryta by carbonate of ammonia, driving off the excess of the ammoniacal salt by heat, evaporating the liquor to the consistence of syrup, and setting it aside till a pulpy matter formed containing crystals. This pulpy matter he separated and expressed, treated it with alcohol, and concentrated the alcoholic solution. Upon cooling, delicate silky needles of narcein were deposited, which were readily purified by repeated solution and crystallization. Meconin, which often crystallizes with it, may be separated by the agency of ether. Its effects upon the system are not known. Narcein is white, neutral, inodorous, slightly bitter, fusible at 197°F. , soluble in 375 parts of cold and 220 of boiling water, soluble in alcohol, and insoluble in ether. Weak acids render it blue, but nitric acid does not redden it, nor the salts of sesquioxide of iron turn it blue. It is dissolved by acids, but does not combine with nor neutralize them. Its formula is $\text{NC}_{23} \text{H}_{20} \text{O}_{12}$.

Meconin, first observed by M. Dublanc, junior, is obtained by precipitating the aqueous infusion of opium with ammonia, washing the precipitate with water until the latter passes colorless, mixing the watery fluids, evaporating them to the consistence of molasses, setting them aside for two or three weeks, during which a mass of granular crystals is formed, then decanting the liquid, expressing the mass, and drying it with a gentle heat. The meconin may be separated from the mass by treating it with boiling alcohol of 36° Baumé, evaporating so as to obtain crystals, dissolving these in boiling water with animal charcoal, filtering the liquid while hot, and subjecting the crystals which form

upon the cooling of the solution to the action of ether, which dissolves the meconin, and yields it in a state of purity by spontaneous evaporation. Meconin is white, crystallizes in hexangular prisms, is neutral in respect to acids, soluble in 265 parts of cold and 18 of boiling water, very soluble in ether, alcohol, and the essential oils, has an acrid taste without bitterness, fuses at 194° , and in this state forms, with chlorine gas, a blood-red fluid, which crystallizes on cooling. It contains no nitrogen, and is volatilizable without change. Gregory gives its formula as $C_{10} H_5 O_4$.

Meconic acid is obtained by macerating opium in water, filtering the infusion, and adding a solution of chloride of calcium, which causes a precipitate of meconate and sulphate of lime. This precipitate having been washed with hot water and with alcohol, is treated with dilute muriatic acid at 180° . The meconate of lime is taken up, and as the liquid cools, bimeconate of lime is deposited. This is dissolved in warm concentrated muriatic acid, which deposits pure meconic acid when it cools. It may be freed from coloring matter by neutralizing it with potassa, decomposing the crystallized meconate thus obtained by muriatic acid, and again crystallizing. It forms in white, brilliant scaly crystals, of an acid taste followed by bitterness, fusible and volatilizable by heat, soluble in four parts of boiling water, also in cold water or alcohol, reddens vegetable blues, and forms salts. Its compounds with the earths and heavy metallic oxides are generally insoluble in water. With the salts of sesquioxide of iron it produces a blood-red color; with a weak solution of ammoniated sulphate of copper it causes a green precipitate; with acetate of lead, nitrate of silver, and chloride of barium, it produces white precipitates, soluble in nitric acid. It has but little action on the system. Its formula is, according to Gregory, $C_{14} H O_{11}$, $3 HO = \overline{Me}$, $3 HO$.

Porphyroxin is neutral, crystallizes in shining needles, is insoluble in water, soluble in alcohol, ether, and weak acids, and is convertible into a beautiful purple-red or rose-colored solution when heated in diluted muriatic acid. It may be obtained by treating powdered opium (previously exhausted by boiling ether, and then made into a pulp by means of water) with carbonate of potassa, agitating it with ether, evaporating the ethereal solution, dissolving the residue in dilute muriatic acid, and precipitating with ammonia. Paramorphia and porphyroxin are thus obtained together. These are to be dissolved in ether, which by spontaneous evaporation deposits the paramorphia in crystals, and the porphyroxin in the form of resin. By the cautious use of alcohol, the porphyroxin is separated, and obtained by evaporating the alcoholic solution.

Papaverina is prepared by precipitating the aqueous infusion of opium with soda, exhausting the precipitate with alcohol, evaporating the tincture to dryness, treating the residue with a dilute acid, filtering,

precipitating by ammonia, dissolving the precipitate in muriatic acid, mixing with the solution the acetate of soda, and treating the resulting precipitate with boiling ether; on cooling the papaverina is deposited. It crystallizes in needles, is insoluble in water, very sparingly soluble in cold alcohol or ether, more soluble in these liquids when boiling hot, but deposited as they cool. It forms salts with acids which are nearly insoluble in water. When moistened with concentrated sulphuric acid, its crystals acquire a dark blue color. Its formula is $\text{NC}_{40} \text{H}_{21} \text{O}_8$.

Pseudomorphia is reddened by nitric acid, and strikes a blue color with the salts of sesquioxide of iron, the same as morphia, but it differs from this in not forming salts with the acids, in not decomposing iodic acid, and in not having any poisonous influence upon the system. It forms shining scales, is sparingly soluble in water and weak alcohol, insoluble in absolute alcohol and ether, and is readily dissolved by caustic potassa or soda. Its supposed formula is $\text{C}_{27} \text{H}_{18} \text{NO}_{14}$.

Properties and Uses.—Opium is a stimulant-narcotic, acting under various circumstances as a sedative, antispasmodic, febrifuge, diaphoretic, and an inspissant of the mucous secretions. Topically, it is a direct stimulant and indirect sedative of the nervous, muscular and vascular systems. A medium dose taken while in health, augments the force, fullness, and frequency of the pulse, increases the heat of the skin, gives energy to the muscles, renders the senses more acute, and produces a general excitement of the whole system—the brain is especially acted upon, the faculties becoming more clear, the ideas brilliant, precise, and under control, the power of application more intense, the conversational energies augmented, and frequently a state of delirium or intoxication is induced. After a time this excitement subsides, leaving a calm, careless, indifferent, pleasurable sensation, with a series of vague, fleeting ideas, which at the end of half an hour or an hour is succeeded by sleep, which continues for six, eight, or ten hours, and is followed by giddiness, languor of the pulse, nausea, headache, tremors, want of appetite, and other symptoms of deranged nervous action. Other effects likewise occur during the period of its influence upon the system, thus—the mucous secretions become suspended, constipation is induced, the cutaneous secretion is increased, the urinary and biliary secretions may be unaffected, or merely inspissated, in consequence of their discharges being impeded. The retention of urine, and constipation, sometimes exist for several days. No injurious consequences will ultimately result from these effects, unless the dose be frequently repeated, so that the natural powers be destroyed by continuous over-excitement. The unpleasant symptoms following the sleep caused by opium may be removed by lemon-juice, strong coffee, or a cathartic.

The effects of opium vary in different persons, and not unfrequently in the same individual under dissimilar circumstances. In some persons the smallest dose will cause nausea, vomiting, and spasm of the stomach;

in others it will occasion feverishness, headache, watchfulness, restlessness, startling, disagreeable visions, delirium, anxiety, and afterward an aggravated degree of the more familiar subsequent effects of this drug; these phenomena constitute what is called the *idiosyncratic action of opium*. Though commonly the result of idiosyncrasy, yet these symptoms are often induced in persons with whom opium in general agrees. Dissolved in vinegar or lemon juice, opium acts more pleasantly, and is less liable to produce the above disagreeable consequences. A disagreeable itching or pricking of the skin, occasionally attended with a slight eruption, will be frequently produced by opium, as well as its various preparations. The narcotic power of opium is lessened by certain states of disease, as in the advanced stage of pneumonia, or peritonitis, by profuse hemorrhage, especially uterine, by severe dysentery, delirium-tremens, some varieties of mania, tetanus, and severe pain or spasm of any kind. It is also modified by the conjunction of other remedies; camphor is thought to diminish the chance of its subsequent or idiosyncratic effects; and given with ipecacuanha, three or four times the ordinary hypnotic dose may be administered without inducing sleep, but with the effect of bringing on sweating with much greater certainty. Through whatever channel opium is introduced into the body—the stomach, rectum, a wound, vein, excoriation, blistered surface, etc.,—its remote action is exerted on the brain. It acts most energetically when it is promptly absorbed; yet it has not been detected in the blood. When opium, or any of its preparations, is applied freely to a blistered, excoriated, or inflamed surface, its effects should be attentively watched, for dangerous accidents have occasionally happened in this way.

In large doses, opium is a poison, producing death if the proper remedies are not promptly and unremittingly resorted to. The state of excitement and exhilaration, if caused at all, is of short duration, being speedily followed by depression of the circulation, and of the functions of the brain, as manifested by diminution of the frequency of the pulse, loss of muscular strength, slow, soft respiration, flaccidity of the extremities, languor, drowsiness, torpor or coma, pale features, excessively contracted pupils, coldness of the limbs, generally retention of urine, and frequently profuse perspiration, together with an almost total insensibility to external impressions. This state ends in death, unless speedily relieved. The remedies are, emetics of mustard and lobelia seed, with strong coffee, stomach pump, external counter-irritation, cold applications to the head and spine, forced exercise, galvanism, and artificial respiration. As soon as the stomach has been properly evacuated by emesis, internal stimulants must be administered, the best of which are brandy and carbonate of ammonia. As soon as consciousness is once fairly restored, an active cathartic, with the continuation of the forced exercise, generally completes the cure. The same toxicological treatment should be pursued in case of poisoning by any of its salts of

morphia. Opium is employed internally in form of pill, powder, tincture, or solution. In addition to the laudanum, and paregoric elixir of the pharmacy, other valuable forms of preparation are used, which it may be proper to notice here.

Rousseau's Laudanum, is in fact a tincture of the acetate of morphia, and is three times as active as Sydenham's laudanum, though liable to uncertainty; it is made by placing a vessel containing twelve ounces of pure honey, and three pounds of warm water, in a warm place; and so soon as fermentation commences, add four ounces of good opium previously diffused in twelve ounces of water, and let the whole ferment for one month. Pour off the liquor, and evaporate to ten ounces; filter, and add four and a half ounces of alcohol. *Sydenham's Laudanum* is prepared by adding to a pint of Spanish wine, a mixture composed of opium two ounces, saffron one ounce, powdered cloves and cinnamon, of each, one drachm. Expose the whole to a sand bath heat for two or three days, and strain. It is double the strength of ordinary laudanum, a fluidrachm being equal to seven and a half grains of opium. The *Black*, or *Quaker's Drop*, is an acetic tincture of opium. It is prepared thus: Take half a pound of good opium in slices, an ounce and a half of bruised nutmegs, and half an ounce of saffron, and boil them in four pounds of verjuice, (or good vinegar), and then add a quarter of a pound of sugar, and two tablespoonfuls of yeast. Place the mixture in a warm place to ferment for the space of six weeks. Then decant, filter, and bottle, adding a little sugar to each bottle. It is about three times stronger than ordinary laudanum, and is preferred by many practitioners, on account of its more uniform agreement with the digestive organs. However, the acetate, or citrate of morphia, are much preferable to these tinctures.

The special uses of opium are so numerous, that it is impossible to do more here than mention the most important of them. In all febrile and inflammatory diseases, it is given either alone, or in combination with ipecacuanha to produce diaphoresis. As an anodyne-diaphoretic this combination is likewise beneficial in rheumatic, neuralgic, and gouty diseases, in nervous irritability, morbid vigilance, restlessness, diarrhea, and dysentery. As an antispasmodic in asthma, colic, cholera, hysteria, tetanus, spasm of the stomach attending gout, spasm of the ureters in nephritis, and of the biliary ducts during the passage of calculi, in convulsive affections, and dyspepsia. Also to relieve cough, nausea, tenesmus, and strangury. In the suppression of morbid discharges it frequently answers an important indication, and proves very advantageous in diarrhea, chronic catarrh, humoral asthma, diabetes, hemorrhages, especially uterine hemorrhage, etc. Indeed it will be found valuable in all symptoms or forms of disease characterized by pain, wakefulness, inflammation, increased nervous excitability, increased

mucous secretions, or spasmodic action. Its use is contra-indicated where there is a great amount of inflammatory excitement, which should be reduced before venturing its internal administration, or the drug should be modified in its action by combination with ipecacuanha, in cases where there is any doubt as to the sufficiency of the reduction. In inflammation of the brain, strong determination of blood to the head, deficient secretion from inflamed mucous membranes, and generally in constipation, it is also contra-indicated. If the constipation depends upon spasmodic action, it may then be given as an antispasmodic in combination with a laxative. Opium is often eaten by persons until it becomes a habit exceedingly difficult to overcome; when taken to excess in this manner it may be known by the deadly pale or sallow aspect, with tokens of emaciation, and a gradual loss of the energies and activity of the whole system. The author of a work entitled, "Confessions of an Opium Eater," tells us that he was cured of this soul-destroying vice by using the Ammoniated tincture of Valerian as a substitute for his opiate stimulant. Probably any other stimulant would have answered the same purpose.

Externally, opium is employed chiefly to subdue pain, and arrest local inflammatory action; it is applied in the form of lotion, liniment, or plaster, and is of service in neuralgia, rheumatism, some forms of cutaneous disease, irritable blistered surfaces, diseased mucous surfaces, and in erysipelatous inflammations. It is likewise added to collyria in ophthalmic affections, and to injections in gonorrhea. There is much variety of opinion among Eclectics as to the use of this drug as a medicine, some contending against its use, and others in its favor. That it is a useful agent in many diseases, and exerts an influence not possessed by any other one, no person will attempt to deny; neither does it, when given in the proper medicinal doses, leave the seeds of after disease in the system, as is the case with arsenical, mercurial, and other preparations, which in small doses decompose the constituents of the body; therefore, although its present results may be disagreeable, yet, as they are not permanent, there is no good reason why we should dispense with an agent so well calculated to lessen the effects of disease upon the human system. When we administer the almost death-like prostrating emetic, lobelia, the energetic, prostrating, and nauseating hydragogue, podophyllin, etc., etc., it is too much like prejudice without reason to oppose opium because its effects continue for a few days, or improper doses and carelessness in its use have resulted in death, and which may, in a degree, be said of every active remedy in the *Materia Medica*.

The dried ripe capsules of poppy have properties analogous to opium, but very feeble, and are sometimes used in decoction, emulsion, syrup, or extract, to calm irritation, lessen pain, promote rest, and produce the general effects of opium; and externally, as an emollient and anodyne application.

Dose of opium in pill or powder from one-fourth of a grain to three grains, according to its influence upon the patient, the nature of the complaint, and the purpose to be effected. Sometimes larger quantities are given, as in severe tetanic, or other nervous affections, and in cases of severe pain. The medium dose to ease pain and produce sleep is, one grain. The dose of the tincture is from ten to fifty drops. When it cannot be taken by mouth, as in cases of obstinate vomiting, and in painful nephritic or uterine affections, strangury from blisters, and in dysenteric tenesmus, it may be injected into the rectum with great advantage, being added to a small quantity of water, flaxseed or elm infusion, starch water, mucilage of gum Arabic, etc. When thus given the quantity may be twice that administered by the mouth—yet the practitioner should be cautious, as some patients are more powerfully influenced by it than others.

Off. Prep.—Enema Opii; Linimentum Capsici Compositum; Linimentum Opii; Mistura Camphoræ Composita; Pilulæ Camphoræ Compositæ; Pulvis Ipecacuanha et Opii; Tinctura Opii; Tinctura Opii Acetata; Tinctura Opii Camphorata; Tinctura Serpentaria Compositæ.

PARTHENIUM INTEGRIFOLIUM.

Cutting Almond.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Necessaria.

THE ROOT.

Description.—This plant, also known by the name of *Nephritic Plant*, is indigenous and perennial, with an erect, striate, pubescent stem, from three to six feet in height. The leaves are alternate, lance-ovate, hispid-scabrous, coarsely dentate-crenate, coriaceous, lower ones petiolate, upper sessile, sometimes clasping; they are from four to twelve inches long, and about half as wide. *Radical petioles* a foot long. *Heads* many-flowered, tomentose, corymbed; *ray-flowers* five, somewhat ligulate, fertile; *disk-flowers* tubular, sterile. *Involucre* hemispherical, five-leaved; *scales* in two series, outer ovate, dilated, inner orbicular; *receptacle*, minute, conical, chaffy; *achenia* five, obovate, compressed, cohering with two contiguous paleæ.

History.—This plant grows in the Middle and Western States, in dry soils, flowering from July to September. The root is the part used. Its growth is singular; it issues from a head or caudex, at first small, but gradually increases in size, and terminates very abruptly, giving off other roots of a similar form, each being a distinct root about the size and shape of a radish, but growing horizontally, and sending up stems from near the large ends of the principal roots, which are blackish outside, and bluish-gray within. Cold water extracts its medicinal virtues. It has not been analyzed.

Properties and Uses.—Diuretic. The root sliced and infused in cold water, and drank in moderate quantities, is useful in suppression of the urine, scalding of the urine, gonorrhea, gravel, and diseases of the kidneys and bladder generally. It is highly recommended by some practitioners in these diseases. Likewise said to be an aromatic-bitter, and stimulant.

PETROLEUM.

Petroleum.

A BITUMINOUS FLUID, ISSUING FROM THE EARTH.

History.—Liquids, or readily fusible solids of native inflammable character, are found in various parts of the globe, which evolve, when heated, a peculiar odor, which burn readily leaving a very small carbonaceous residue, and which are called *Bitumens*; to this class of substances Petroleum belongs. They are of two kinds, one liquid, called Naphtha, the other solid, termed Asphaltum.

Naphtha is a transparent, yellowish-white, ethereal, very mobile, inflammatory, and very light liquid, and is found in abundance in Persia. It consists exclusively of hydrogen and carbon; and on account of the absence of oxygen in its composition, it may be used for preserving potassium. Dr. Andreosky, of the Russian army, has, it is stated, used it with benefit in Asiatic Cholera, in doses of from ten to twenty drops, given in half a glass of white wine, or in mint water. The *artificial naphtha* obtained during the formation of coal gas, when rectified becomes as light and limpid as the natural fluid; and in this state is said to dissolve caoutchouc, the solution having been usefully applied to the purpose of forming several surgical instruments of that material; it has also been employed for giving a thin coating of caoutchouc to cloth or other fabrics, to render them water-proof. They are varnished with the solution on one side, and the varnished surfaces are applied to each other, and made to adhere by powerful pressure.

Asphaltum is a solid, black, dry, friable substance, insoluble in alcohol, but soluble in oil of turpentine by the aid of heat, forming an ink or paint. Naphtha and Asphaltum often exist, naturally combined together; when the asphaltum predominates, the viscid substance formed is called *Maltha* or *Mineral Tar*; when the naphtha is in the larger proportion, the thick fluid produced is termed *Petroleum*.

Petroleum is found principally at Amiano in the Duchy of Parma, at Gabian in France, upon the borders of the Caspian Sea, in the kingdom of Ava, and in Barbadoes, Trinidad, and other West India islands. The wells of petroleum in Ava are said to produce four hundred thousand hogsheads annually. The petroleum from Barbadoes is indicated as the officinal variety by the London and Dublin Colleges. In the United States petroleum is found in various localities, the principal of

which are on the Kanawha, in Virginia; near Scottsville, in Kentucky; in Western Pennsylvania; on Duck Creek in Ohio; and on the shores of Seneca Lake in New York. That found in the latter locality is usually called in this country *Seneca oil*, and similar varieties of petroleum from other native sources are known by the same name.

Barbadoes Petroleum, sometimes called Barbadoes Tar, as well as that from Trinidad, is of a dusky-greenish brown, or black color, nearly opaque, inflammable, of a strong, peculiar, not agreeable, bituminous taste and odor, unctuous to the touch, and having the consistence of very thick cream or molasses. When exposed to the air it gradually hardens to the consistence of pitch. Heat increases its liquidity, but not its thorough mobility; and a higher heat, by distillation, expels naphtha, leaving a solid residue of asphaltum. Alcohol, acids, and alkalies have but little effect upon it; ether dissolves it, the solution becoming green; and the fixed and volatile oils likewise dissolve it. It consists chiefly of carbon and hydrogen, with a little oxygen and nitrogen. The *Rangoon Petroleum* has also a dark greenish-brown color, a strong rather fragrant odor, and the consistence of lard in warm weather; when heated to 90° it becomes a very mobile liquid. By distillation it yields a large quantity of naphtha, and afterward a crystalline principle, identical with paraffin. In the naphtha Dr. Gregory subsequently discovered eupione. It is, probably, more active than the Barbadoes Petroleum.

Properties and Uses.—Petroleum is considered a stimulating antispasmodic and sudorific, and has been recommended as a remedy in various diseases. In diseases of the chest not attended with inflammation it has been reputed beneficial, and is extolled as a vermifuge, especially for tapeworm. For this purpose it may be taken inwardly in the form of emulsion, and applied externally by friction over the abdomen. Schwartz's formula in such cases, was a mixture of one part of petroleum with one and a half parts of tincture of assafoetida, of which forty drops were given three times a day. Externally, it is employed as a stimulating embrocation in chilblains, chronic rheumatism, affections of the joints, and paralysis. It is likewise beneficial in cutaneous diseases, especially lepra, psoriasis, and other scaly diseases. The dose of Petroleum is from ten to thirty minims, given in any convenient vehicle.

British Oil is composed of eight fluidounces each of Oil of Turpentine, and Oil of Linseed; four fluidounces each of Oil of Amber, Oil of Juniper; three fluidounces of Barbadoes Petroleum, and one fluidounce of American Petroleum or Seneca Oil.

Seneca or Rock Oil is lighter colored, of thinner consistence, and less sapid and odorous than the Barbadoes, and probably contains more naphtha; it is considerably used in domestic practice as an external application.

PHOSPHORUS.

Phosphorus.

Preparation.—Phosphorus is made by adding to bone ashes, which consist principally of phosphate of lime, two-thirds their weight of strong sulphuric acid previously diluted with twelve times its weight of water; allow them to digest for twenty-four hours. The sulphuric acid combines with the lime, and precipitates as sulphate of lime, while a superphosphate of lime remains in solution. The whole is strained through a linen cloth to separate the sulphate of lime, and afterward submitted to evaporation, which causes a fresh precipitation of sulphate, requiring to be separated by a new filtration. The filtered solution of superphosphate is evaporated to a syrupy consistence, and then thoroughly mixed with half its weight of powdered charcoal, so as to form a soft mass, which is dried by being heated to dull redness in an iron pot. The mass, when cool, is quickly transferred to a coated earthenware retort, furnished with an adopter of copper, bent downward at right angles so as to enter a bottle with a large neck containing water which should rise about two lines above the orifice of the adopter. The bottle is closed round the adopter by a cork, which is traversed by a small glass tube, to give exit to the gaseous products. The retort is heated in a furnace, furnished with a dome, in the most gradual manner, so as to occupy about four hours in bringing it to a red heat. Afterward, the heat is pushed vigorously, so long as any phosphorus drops into the water; and this takes place generally for from twenty-four to thirty hours. During this part of the process, the excess of acid in the superphosphate is decomposed; its oxygen combining with the charcoal, and the liberated phosphorus distilling over. A quantity of the materials sufficient to fill a quart retort will yield about a pound of phosphorus. The calcined bones of sheep are generally preferred, as they contain most phosphate of lime, and are more readily acted on by the acid.—*U. S. Disp.*

M. Donovan has offered a process which facilitates the preparation of phosphorus. It is as follows: Take beef or sheep bones as they are found in commerce, with their natural quantity of fatty matter and moisture. Digest them for four hours in a mixture of one part of nitric acid of commerce, and ten parts of water. This dissolves the calcareous salts, leaving the soft gelatinous tissues which retain the form of the bones, and which may be washed and employed in the manufacture of glue. The acidulated liquid containing the phosphate and nitrate of lime, is to be treated with an excess of neutral acetate of lead, and the precipitated phosphate of lead washed and dried. It is then put in a covered crucible and heated to redness to condense its volume, which operation requires great care, else the phosphate will lose its pulverulent form and fuse, requiring a difficult pulverization. The dense pulverulent phosphate of lead is then intimately mixed with one-sixth

of its weight of charcoal, previously calcined, and afterward distilled in the ordinary manner in large earthen retorts, properly heated.

History.—Phosphorus was discovered in 1669 by Brandt, and was at first obtained from putrid urine; in 1769 it was found in bones by Gahn who published a process for obtaining it. It is a semitransparent solid, without taste, but possessing an alliaceous smell. When perfectly pure, it is colorless; but as usually prepared, it is yellowish or reddish-yellow. It is flexible, sectile, and when cut, exhibits a waxy luster. It is insoluble in water, but dissolves sparingly in alcohol and the oils, and more freely in ether. Its sp. gr. is 1.84 and its equivalent number 32. It takes fire at 100°, melts at 108°, and boils at 550°, air being excluded. During its combustion, it combines with the oxygen of the air, and forms phosphoric acid. On account of its great inflammability, it requires to be kept under water. When exposed to the air, it undergoes a slow combustion, emitting white vapors, which are luminous in the dark. It forms with oxygen, hypophosphorus, phosphorus, and phosphoric acids, and the two isomeric varieties of phosphoric acid, called pyrophosphoric, and metaphosphoric. With hydrogen, it forms phosphureted hydrogen and subphosphureted hydrogen. The only medicinal combinations containing phosphorus are phosphoric acid and the phosphates of mercury, iron, lime, and soda. Phosphoric acid in a diluted state, and the three latter phosphates are officinal. In contact with chlorine, bromine, or iodine, without the aid of heat, combustion takes place spontaneously, while the phosphorus combines with these metalloids. It occasionally contains arsenic, antimony or sulphur, from which it should be freed. Those who work in phosphorus, as manufacturers of lucifer matches, are liable to necrosis of the jaw-bone, the consequence of periostitis.

Properties and Uses.—In small doses, and properly diluted, phosphorus acts as a powerful diffusible stimulant; in large doses, or when given in substance, it acts as a violent irritant poison. Its action is especially directed to the kidneys and genital organs, producing diuresis, and a sexual excitement. It is, undoubtedly, an aphrodisiac, and is of much service in the impotence of old and debilitated subjects. It has been recommended in extreme prostration of the vital powers, dropsy, typhus fever, phthisis, marasmus, chlorosis, paralysis, amaurosis, mania, etc. It should never be used in substance, but in solution with ether and oil. The following is a good formula: Take of phosphorus, cut in pieces, four parts; sulphuric ether, two hundred parts; mix, and macerate in a darkened bottle, or in a dark place for one month; then add one hundred parts of oil of cinnamon, or any other oil, and mix thoroughly together. Decant this into blackened ounce vials, and have them well stopped. Dose, is from ten to fifteen drops, every three hours, in some mucilaginous liquid. In the exhibition of phosphorus, great caution is necessary, and its effects must be closely watched. It should never be given in substance as it is apt to cause violent irritation of the stomach. When taken in a

poisonous dose, give an emetic followed by copious draughts of water and magnesia, which arrest its combustion, and neutralize any phosphoric acid which may form. The following, administered in copious draughts, has been recommended as an antidote to phosphorus: Calcined magnesia 4 grains; chlorine water 16 grains; distilled water 224 grains; mix. Phosphorus is seldom employed in Eclectic practice.

Off. Prep.—Acidum Phosphoricum Dilutum.

PHYSALIS VISCOSA.

Ground Cherry.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE BERRIES.

Description.—This plant, also called *Yellow-henbane*, is indigenous, perennial and pubescent, having a herbaceous, decumbent stem, about a foot high, and which is often viscid as well as the whole plant. The branches are somewhat dichotomous and angular. The leaves are very variable, even in the same plant, solitary or in pairs, ovate, or lanceolate-ovate, cordate or acute at base, often obtuse at the apex, repand-toothed or entire, petiolate, from one to four inches in length, and one-half, or two-thirds as broad, or even of equal breadth; when they occur in pairs, one of them is much smaller. The flowers are solitary, axillary, pendulous; the corolla is campanulate-rotate, twice as long as the calyx, tube very short, limb obscurely five-lobed, greenish-yellow, with five brownish spots at base inside. The calyx is five-cleft, persistent, enlarged, inflated, angular; stamens five, connivent; anthers opening lengthwise. Fruit a yellow or orange-colored berry, inclosed in the calyx. There are many varieties of this plant, some of which have been unnecessarily divided into species, as *P. Obscura*, *P. Pubescens*, *P. Pennsylvanica*, and *P. Philadelphia*.

History.—This plant is common in many parts of the country, and is found growing in dry fields, hill-sides, and road-sides, flowering in July and August. Its root is fusiform, white, and bitter, and will probably act as a bitter-tonic; the fruit or berries are slightly acid and edible with a faint bitterness. Water or proof spirit extracts their properties.

Properties and Uses.—Tonic, laxative, and diuretic, said also to be sedative. The juice of the berries, or a strong infusion is reputed very beneficial in suppression of the urine, gravel, and other urinary disorders. Dose of the juice of the berries, one or two ounces.

The *Physalis Alkekengi*, or Winter Cherry, of Europe, with the stem somewhat branching below, the leaves in pairs, entire, acute; flowers white; calyx of the fruit red or reddish, with acid and somewhat bitter berries, and growing about a foot high, possesses similar properties, and is likewise recommended as a febrifuge.

Dessaigues and Chautard have obtained the bitter principle of the *Physalis Alkekengi*, which they call *Physaline*, and which has been

employed with success in intermittent fever. An alcoholic extract of the plant was prepared, which yielded a bitter dark-colored mass; the bitter principle was taken up by cold water, and was separated either by means of charcoal, from which it was afterward dissolved by alcohol, or by shaking the aqueous solution with chloroform. The bitter principle thus obtained was pulverulent, slightly colored, and very bitter. When pure, *physaline* is a white powder, with a faint tinge of yellow; its taste is at first faintly, afterward permanently bitter; it is noncrystalline, softens at 356° or 374°, and then soon decomposes, burning with a smoky flame. It is sparingly soluble in cold water, to which it communicates a bitter taste; more soluble in hot water, chloroform and alcohol; and sparingly soluble in ether and acids. It is dissolved by ammonia, and remains unaltered after its volatilization; is not precipitated by nitrate of silver and ammonia from the alcoholic solution, but is precipitated by an ammoniacal solution of acetate of lead. They give its formula as $C_{26}H_{32}O_{10}$. The fruit of the *physalis* contains citric acid.

PHYTOLACCA DECANDRA.

Poke.

Nat. Ord.—Phytolaccaceæ. *Sex. Syst.*—Decandria Decagynia.

THE ROOT, LEAVES AND BERRIES.

Description.—This plant is known by various other names, as *Pigeonberry*, *Garget*, *Scoke*, *Coakum*, etc. It is indigenous, with a perennial root of large size, frequently exceeding a man's leg in diameter, usually branched, fleshy, fibrous, whitish within, easily cut or broken, and covered with a very thin brownish bark or cuticle. The *stems* are annual, about an inch in diameter, and from five to eight feet in height, round, smooth, and very much branched; when young they are green, and become of a fine deep purple when matured. The *leaves* are scattered, petiolate, ovate-oblong, smooth on both sides, ribbed underneath, entire, acute, and five inches long by two or three in breadth. The *flowers* are numerous, small, greenish-white, on long pedunculated racemes opposite to the leaves, sometimes erect, and sometimes drooping. *Peduncles* nearly smooth, angular, ascending; *pedicels* divaricate, sometimes branched, green, white, or purple, having a small linear bract at base, and two others in the middle. *Calyx* whitish, consisting of five round-ovate, concave, incurved sepals. *Stamens* ten, somewhat shorter than the sepals, with white, roundish, two-lobed anthers. *Ovary* green, round, depressed, ten-furrowed. *Styles* ten, short, recurved. *Berries* in long clusters, dark-purple, almost black, round, depressed or flattened, marked with ten furrows on the sides. *Cells* ten; *seeds* ten, solitary; *embryo* curved in a ring around the albumen.

History.—Poke is a native of the United States, growing in nearly all parts, along fences, in newly cleared spots, uncultivated fields, road-sides,

moist grounds, etc., and flowering from July to September. It is likewise found naturalized in some parts of Northern Africa and Southern Europe. The young shoots are often used for greens, but become cathartic when they have attained any size. The ashes of the stem and leaves contain a large proportion of potassa, at least forty-two per cent., which, in the plant, is in union with an acid resembling the malic; some persons have successfully employed the ashes as a local application to cancer. The officinal parts are the root, leaves, and berries.

The *root* should be gathered late in November, cut into thin transverse slices, and dried with a moderate heat; it loses its virtues by keeping, and should, consequently, be replaced by a fresh supply every year. When properly dried, it is in transverse slices, of a light yellowish-brown color externally, wrinkled, and presenting on the internal cut surface, numerous concentric rings, formed by the projecting ends of fibers, between which the intervening matter has shrunk in the drying process. In the older roots the structure is firm and almost ligneous, having a yellowish-white color, alternating with darker circular layers. It has no smell, but the taste is mild, and slightly sweetish, followed by a sense of acrimony. Boiling water, or alcohol extracts its active principles. Analysis has detected in it tannic acid, gum, starch, sugar, resin, fixed oil, lignin, and various inorganic principles. The *leaves* should be gathered a short time previous to the ripening of the berries. The berries must be collected when they are fully ripened; they contain a succulent pulp, and yield upon pressure a large quantity of a purplish-red juice. They have but little odor, and a nauseous sweetish taste. The coloring principle of the juice is evanescent, and cannot, consequently, be applied to the purposes of dyeing. Alkalies turn it yellow, but acids restore it to its original color. The juice contains saccharine matter, and after fermenting, yields alcohol by distillation.

Properties and Uses.—Poke is emetic, cathartic, alterative, antihyperpetic, and somewhat narcotic. In doses of from ten to thirty grains it acts both as an emetic and cathartic, but is seldom used for these purposes on account of the slowness of its action, which, when established, continues for a long time. Narcotic effects as drowsiness, dimness of vision, vertigo, etc., frequently attend its action, but very rarely any pain or spasm. Overdoses cause excessive vomiting or purging, great nervous prostration, occasionally convulsions, and sometimes a tingling or prickling sensation over the whole surface. In doses of from one to five grains it acts as an alterative. The root excites the whole glandular system, and has been highly extolled in syphilitic, scrofulous, rheumatic, and cutaneous diseases. The extract of the root is an excellent remedy for the removal of those severe pains attending mercurio-syphilitic affections (osteocopus), in which it is more beneficial than opium. The root roasted in hot ashes until soft, and then mashed and applied as a poultice, is unrivaled in felons and tumors of various

kinds. It discusses them rapidly, or, if too far advanced, hastens their suppuration. Care must be had in powdering the root, as it sometimes occasions headache, purging, prostration of strength, and all the symptoms of a severe coryza. A drachm of the pulverized root or leaves, mixed with an ounce of lard has proved beneficial in psora, tinea-capitis, and some other forms of cutaneous disease; when first applied it occasions a sense of heat and smarting.

The leaves are somewhat purgative, and are used, in some parts of the country, as a dressing to ulcers. A strong decoction of the leaves is of much benefit in hemorrhoids; injected into the rectum two or three times a day, and a fomentation of the leaves applied to the part, will almost always give relief, and eventually effect a cure. A fluidrachm or two may be taken internally at the same time, and repeated two or three times a day; should any narcotic effects be produced, its use may be omitted for a day or two, and then commenced in smaller doses. The inspissated juice of the leaves has been recommended in indolent ulcers, and as a remedy in cancer; in this last disease, Dr. Bone combined it with gunpowder.

A saturated tincture of the berries has been successfully employed in chronic rheumatism. It is also recommended in the same diseases as the root. Dose of the powdered root, as an alterative, from one to five grains; of the tincture, one fluidrachm, three or four times a day; as an emetic, twenty to thirty grains of the powder.

The Franklin Institute of the city of New York advertise the active principle of poke root under the name of *Phytolaccin*; said to be a light-brown powder, with a pleasant, mucilaginous taste, soluble in water, and insoluble in alcohol or ether. I am not advised of its mode of preparation. Said likewise to be a most powerful alterative, aperient, and slightly narcotic. Dose from one-fourth of a grain to a grain, three times a day.

Off. Prep.—Cataplasma Phytolacæ; Decoctum Phytolacæ; Extractum Phytolacæ; Pilulæ Phytolacæ Compositæ; Syrupus Phytolacæ Compositus; Tinctura Phytolacæ; Tinctura Cimicifugæ Composita; Unguentum Phytolacæ; Vinum Phytolacæ Compositum.

PICRÆNA EXCELSA.

Quassia.

Nat. Ord.—Simarubaceæ. *Sex. Syst.*—Decandria Monogynia.

THE WOOD.

Description.—This is the *Quassia Excelsa* of Linnæus, and the *Simaruba Excelsa* of Decandolle, and is known by the various names of *Lofty Quassia*, *Bitter-wood*, *Bitter-ash*, etc. It is a tall tree, frequently attaining a height of one hundred feet, with a straight, tapering stem, often ten

feet in circumference. The *branches* are given off near the top, and with the trunk, are covered with a smooth gray, or ash-colored bark; that of the *roots* is of a yellowish color. The *wood* is of a pale-yellow hue, tough, but not very hard, though susceptible of a good polish. The *leaves* are pinnate, with a naked petiole, and are composed of from four to eight pairs of nearly opposite, elliptical, pointed, entire, smooth leaflets upon short footstalks, with a terminal leaflet. The *flowers* are in corymbose clusters, numerous, small, of a yellowish-green, some male, and the rest hermaphrodite in the same cluster. The *calyx* is very small, with five equal, ovate, pointed sepals. The *corolla* consists of five equal, lanceolate petals, longer than the sepals. The *stamens* are five, somewhat longer than the petals, pubescent, and supporting roundish *anthers*. The *ovary* is ovate, and surmounted by a slender, grooved *style*, which is trifid at the apex. The *fruit* is a small black drupe, usually three, sometimes only one or two, attached to the side of a fleshy receptacle.

QUASSIA AMARA, or *Bitter Quassia*, is a small tree or shrub, much branched, and covered with an ash-colored bark. The *leaves* are alternate, and consist of two pairs of *leaflets*, and a terminal one; they are elliptic-lanceolate, entire, very smooth, two or three inches in length, and of a deep-green color. The common *footstalk* is narrow, but winged on each side with a leafy membrane, which expands toward the base of each pair of leaflets, where it is also jointed or articulated. The *flowers* are hermaphrodite and decandrous, have a brilliant scarlet color, and terminate the branches in long spikes, which are secund and bracteate. The *bracts* are lanceolate, reflexed, and of a pink color. The *calyx* consists of five small, persistent sepals. The *corolla* is formed of five lanceolate petals, which are never fully expanded, being twisted in a spiral manner, and opening irregularly; at the base of the corolla is placed the *nectary*, consisting of five roundish, colored scales. The *stamens* are ten, slender, longer than the corolla, and bearing simple *anthers*, attached by their middle so as to be transverse. The *ovary* is ovate, five-parted, and supports a slender style, longer than the stamens, and terminated by a subulate stigma. The *fruit* consists of five black drupes, containing a small unilocular nut, and all attached to a fleshy receptacle.

History.—The *Quassia Amara* is a native of Surinam, flowering in November and December, and is cultivated in some of the West India Islands. It was discovered by a negro, named Quassi, who had become celebrated for his success in curing the malignant fevers of that country; he kept his remedy a secret, until a Swede, Mr. Rolander, obtained the knowledge of it, by giving him a valuable consideration for it. The bark, wood, and root of this tree, were formerly officinal, but it is very doubtful whether, at this time, any of these reach our markets. They

are all excessively bitter, and the root especially, has proved very efficacious in malignant fevers. The *quassia amara*, has now become superseded by the following article.

Picræna Excelsa is a native of Jamaica, and some of the other West India Islands, flowering in October and November, and ripening its fruit in December and January. The wood of this tree furnishes the quassia of commerce, and is used as a substitute for the genuine quassia of Surinam. It is imported in large cylindrical billets, several feet in length, of various diameters, occasionally larger than a man's body, and split into quarters, and frequently retaining a slightly adherent, smooth, and brittle bark, of equal virtue with the wood. These are undoubtedly derived from the trunk or branches, and not from the root. The wood is very tough, close in texture, at first whitish, but by exposure becomes yellower than Surinam quassia; it is inodorous, of a pure, intensely bitter taste, and imparts all its active properties to water and alcohol. The bark is thin, dark-brown, or thick, grayish-brown, wrinkled, and traversed by reticulating lines. Its virtues are owing to a bitter principle discovered by Winckler, called *Quassin*.

Quassin may be obtained by concentrating a decoction of the wood to three-quarters of the weight of the wood employed, agitating it when cold with slaked lime for twenty-four hours, and filtering, which separates the pectin and other substances. The filtered liquor is then to be evaporated nearly to dryness, and the residuum to be acted on by boiling alcohol of specific gravity 0.835, which dissolves the quassin, and leaves behind gum, salt, nitre, etc. The alcoholic solution must then be evaporated to dryness, when impure crystals will be obtained. To purify them, dissolve them in the least possible quantity of absolute alcohol, and then add a large proportion of ether, which throws down a brown mass; filter the liquor and evaporate to dryness. This solution in absolute alcohol, the addition of ether, etc., must be repeated until the quassin is obtained colorless. As it is not disposed to assume a crystalline form by this process, it may be effected by pouring the alcoholic solution mixed with ether upon a small quantity of distilled water, and allowing it to evaporate spontaneously. Quassin is white, opaque, unalterable in the air, inodorous, and intensely bitter; it is freely soluble in alcohol, sparingly so in ether, soluble in two hundred parts of water, but the solubility of which is increased by the addition of acids or alkalies, and is perfectly neuter. When heated, it melts like a resin. Its aqueous solution is not disturbed by iodine, chlorine, corrosive sublimate, solutions of iron, nor acetate of lead, but is precipitated by tannic acid. It consists of carbon, hydrogen and oxygen.

Properties and Uses.—Quassia is tonic, febrifuge, and anthelmintic. It is used sometimes in remittent and intermittent fevers; likewise in dyspepsia, debility during convalescence from exhausting diseases, and

for worms. It preserves animal matters from decay, which is a property possessed more or less by all simple bitters. The decoction administered by way of injection, will remove ascarides. An infusion may be made by macerating for twelve hours, an ounce of the rasped or ground quassia in a pint of cold water; the cold water does not dissolve the extractive matter. Of this a wineglass half full may be taken three times a day, either alone, or with some ginger tea, and will be found useful for feeble, emaciated persons, with impaired digestive organs. Or an extract made by evaporating the decoction to a pilular consistence, may be given in doses of one grain, three or four times a day, and which will be found less offensive to the stomach than the infusion or decoction. Quassia, in connection with sulphuric acid, enters largely into the composition of an Antibacchanalian Elixir, for the cure of drunkenness, and which does certainly destroy all appetite for alcoholic drinks. On flies and other insects quassia acts as a powerful narcotic poison, and the alcoholic extract kills small animals, when introduced into the cellular tissue. Mr. Brande, in his work on chemistry, recommends a strong decoction of quassia, well sweetened with brown sugar or molasses, as an effectual poison for flies, and far preferable to the poisonous articles generally used to destroy them. It is certainly worth a trial. Dose of the powder, thirty grains; of the infusion, from one to three fluidounces; of the tincture, one or two fluidrachms; and of the extract, from two to ten grains.

Off. Prep.—Infusum Quassiæ.

PIMPINELLA ANISUM.

Anise.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE FRUIT. ANISEED.

Description.—Anise has a perennial fusiform woody root, and an erect, branched, solid, round, jointed, striated stem, somewhat rough or downy, and growing about a foot high. The leaves are petiolate; the lower or radical ones are roundish, cordate, three to five-lobed, unequally toothed, and supported on furrowed, sheath-like petioles; the middle cauline ones are pinnate-lobed, with cuneate or lanceolate lobes; the upper cauline ones are trifid, undivided, linear. The flowers are small, white, and disposed in flat, terminal umbels, without any involucre. The calyx is very minute or wanting. The corolla consists of five nearly equal, obcordate petals, incurved at tip. The stamens are five, filiform, longer than the petals, with roundish anthers. The ovary is ovate, downy, with long spreading, subulate, capitate styles bearing obtuse stigmas. The fruit is ovate, a line and a half long, dull brown, slightly downy, and not at all shining; the mericarps with five rather prominent ribs, the intervals being rugose.

History.—Anise is a native of Egypt, but is extensively cultivated in many parts of Southern Europe. That produced in Spain is smaller than the French or German, and is usually preferred. The fruit, popularly called *Aniseed* is the officinal portion. Aniseed is about a line or a line and a half in length, oval, striated, somewhat downy, attached to their footstalks, of a light greenish-brown color, with a shade of yellow. They have a powerful, penetrating, fragrant odor, and a warm, sweet, aromatic taste. Their virtues depend upon a volatile oil, and are imparted sparingly to water, but freely to alcohol. The volatile oil is officinal; it resides in the envelope of the seeds, and may be readily obtained by distillation with water or spirit. The internal substance of the seeds contains a bland fixed oil, and when they are expressed, a greenish oil is obtained, which consists of a mixture of the fixed and volatile oils. When the seeds are collected before maturity, they are apt to become impaired in quality, by a slight fermentation in the mass.

Star-aniseed, which is much used to flavor liquors, being called by the French *Badiane*, in its sensible properties is similar to the common aniseed; and the volatile oil upon which its virtues depend, is sold as oil of common anise, and is regarded by some to be much superior. It is derived from an evergreen tree growing in Eastern Asia, called *Illicium Anisatum*; the fruit or seeds consist of five or ten brownish ligneous capsules four or five lines in length, united together in the form of a star, each containing a brown shining seed.

Properties and Uses.—An aromatic carminative; used in cases of flatulency, flatulent colic of infants, and to remove nausea. Sometimes added to other medicines to improve their flavor, correct griping and other disagreeable effects. The dose of aniseed, bruised or powdered, is from twenty to forty grains.

Off. Prep.—Oleum Anisi.

PINUS PALUSTRIS.

Long-leaved Pine.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE CONCRETE JUICE. (*See Oil of Turpentine.*)

Description.—This tree is also known by the names of *Broom Pine*, *Yellow Pitch-pine*, etc., and is the *Pinus Australis* of Michaux. Its trunk rises to the height of from sixty to eighty feet, of which distance about forty or fifty feet below the branches has a diameter varying from twelve to twenty inches; the bark of the tree is slightly furrowed. The leaves are in threes, of a brilliant green color, about a foot long, and united in bunches at the ends of the branches; the *sheaths* or *stipules* are pinnatifid, scaly, persistent; *buds* very long, whitish. *Sterile aments* violet colored, two inches long. *Strobiles* or *cones*

sub-cylindrical, muricate, with small recurved spines, and from eight to ten inches long. *Seeds* with a thin, white testa.

History.—This is a very large indigenous tree, found in the Middle, Southern, and Western States, growing in dry sandy soils. Its timber is strong, compact and durable, and is much used by carpenters and others. From this tree is obtained the greater part of the tar, turpentine, resin, etc., used in the United States. The concrete juice is the *white turpentine* of commerce; it is obtained by making excavations in the trunk during the winter months, about three or four inches from the ground, and of sufficient size to contain three or four pints. About the middle of March the juice begins to flow into these, and continues to flow throughout the warm season, being removed as the excavations become filled; this is placed in casks, where it slowly thickens, acquiring a soft solid consistence. It is yellowish-white, of a peculiar, somewhat aromatic odor, and a warm, pungent, bitterish taste. It is somewhat translucent, and of a consistence which varies with the temperature; when exposed to the air it ultimately becomes hard and dry. When recent it affords about seventeen per cent. of essential oil. It is almost wholly soluble in alcohol or ether, and readily unites with the fixed oils.

Venice Turpentine is procured from the *Larix Europæa*, or *Abies Larix*; it is a viscid liquid of the consistence of honey, imperfectly transparent, yellowish, or slightly greenish in color, having a strong not disagreeable odor, and a warm, bitterish, and very acrid taste. It is soluble in alcohol, does not readily concrete upon exposure, and is not solidified by one-sixteenth of magnesia. The brown venice turpentine of the shops, is a factitious article said to be made by dissolving resin in oil of turpentine. See *Abies Larix*.

Chian Turpentine is obtained from the *Pistachia Terebinthus*; it is a thick, tenacious liquid, of a greenish-yellow color, a peculiar penetrating, rather agreeable odor, and a mild taste without bitterness or acrimony. Exposure to the air gradually hardens it.

Bordeaux Turpentine is the product of several species of pine, but chiefly the *Pinus Sylvestris*, and *Pinus Maritima*. It is whitish, turbid, and thickish, and on standing separates into a transparent liquid fluid, and a fluid of the color and consistence of thickened honey. There are various other turpentines noticed in foreign *Materia Medicas*, but not being found in this country, it is unnecessary to describe them. All the turpentines have a similarity in taste and odor, yet differing sufficiently to characterize each kind. They become thick and eventually solid by exposure, are softened or rendered more liquid by heat, and burn with a white flame and much smoke. Some of them are solidified by the addition of magnesia; alcohol or ether almost completely dissolves them, and they readily unite with the fixed oils by heat.

An adhesive and strengthening plaster may be made as follows: Take of Caoutchouc, reduced to fine shreds, five pounds, steep it in hot water to soften; then remove from the water, dry as quickly as possible, place in a vessel, and cover with oil of turpentine, which must be increased in quantity as the caoutchouc absorbs it. When the gum is sufficiently dissolved, press it through a fine sieve, and add to it the following mixtures: 1st. White turpentine, melted and dissolved in a sufficient quantity of oil of turpentine to make it thin enough to strain; 2d. Capsicum, four ounces, heated in a quart of oil of turpentine, which must be filtered and gradually added and ground with a pound of litharge, and to which Balsam of Peru six ounces, is to be added. This plaster may be spread on paper, linen, or leather.—The *phosgene* which is used in lamps as a substitute for oil, is said to be composed of, alcohol of 100 per cent., four gallons and a half, oil of turpentine one gallon, camphor two ounces. *Burning fluid* may be made in two different ways: 1st. Add together alcohol of 90 per cent. ten gallons, oil of pine, one gallon, camphor, four ounces; or 2d. Alcohol 90 p. c. six gallons, phosgene, one gallon, oil of turpentine, one pint; mix.

Properties and Uses.—The turpentines owe their influence upon the system to their essential oil. The urine is changed to a violet color by their use, and if used too freely, they are apt to occasion strangury, especially when they do not act upon the bowels. White turpentine possesses stimulant, diuretic, and anthelmintic properties, and in large doses it is laxative. Used in gonorrhea, gleet, leucorrhea, chronic diseases of the urinary passages, in chronic catarrhal affections, chronic rheumatism, piles, chronic inflammation or ulceration of the bowels and in chlorosis and amenorrhea. Externally, it is rubefacient and stimulant, and enters into various plasters and ointments. Dose, is from a scruple to a drachm, in pill form, or in emulsion with gum arabic, or yolk of egg, loaf sugar, and water. *Venice Turpentine*, *Chian Turpentine* and *Bordeaux Turpentine*, possess similar properties, but are seldom used in this country.

Off. Prep.—Emplastrum Myricæ; Pilulæ Ferri Compositæ; Unguentum Myricæ; Unguentum Plumbi Compositum; Vinum Phytolacææ Compositum.

PIPER ANGUSTIFOLIUM.

Matico.

Nat. Ord.—Piperacææ. *Sex. Syst.*—Diandria Trigynia.

THE LEAVES.

Description.—This plant is the *Artanthe Elongata* of Miguel, and the *Stephensia Elongata* of Kunth; it is described as a shrub with a jointed stem, growing to the height of about twelve feet. The leaves are sessile

or petiolated very shortly, oval-lanceolate, acuminate, two or three inches long by about one in breadth, bright green on the upper surface, paler and downy beneath, crenate, minutely and strongly reticulated, of an agreeable aromatic odor, and a strong spicy taste. The *spikes* are solitary, opposite the leaves, and cylindrical. The *bracts* are pellate or cucullate; the *flowers* hermaphrodite.

History.—This plant is a native of Peru, and was introduced to the profession by Dr. Ruschenberger, of the U. S. Navy. In the imported drug, the leaves spikes and stalks are mixed together, and more or less compressed in packages. They are easily pulverized, forming a light, greenish, absorbent powder. Water takes up their aroma and a slight pungency, but no astringency. Infusion of galls produces a gray precipitate with infusion of matico; the sesquichloride of iron causes a deep green one; tartar-emetic, corrosive sublimate, and gelatin scarcely affect it. They are said to contain chlorophylle, a soft dark-green resin, brown and yellow coloring matters, gum, salts, lignin, a light-green, thickish volatile oil, and a peculiar bitter principle, soluble in water and alcohol, but not in ether, named *Maticin*; to this and the volatile oil, matico probably owes its activity.

Properties and Uses.—Aromatic, tonic, and stimulant, and exerts an influence on the urinary passages. Highly recommended in hemoptysis, hematemesis, dysentery, and hematuria, in doses of one drachm of the powdered leaves, or one or two fluidounces of the infusion, four times a day. The leaves and flowering tops have been used with advantage in diseases of the mucous membrane, as gonorrhea, leucorrhea, menorrhagia, catarrh of the bladder, hemorrhoids, and epistaxis. Externally, the leaves are used for arresting hemorrhage from wounds, leech-bites, etc.; the downy part of the leaf is said to be the most active part. Also applied to ulcers. A tincture is also used, made with two ounces and a half of the leaves to a pint of diluted alcohol, of which the dose is from one to three fluidrachms.

Off. Prep.—Infusum Matico.

PIPER CUBEBA.

Cubebs.

Nat. Ord.—Piperaceæ. *Sex. Syst.*—Diandria Trigynia.

THE BERRIES.

Description.—This is a climbing perennial plant, with a smooth, flexuous, jointed *stem*; the *branches* round, about as thick as a goosequill, ash-colored, smooth, rooting at the joints; when very young minutely downy, as well as the petioles. The *leaves* are petiolate, oblong or ovate-oblong, entire, acuminate, rounded or obliquely cordate at base, strongly nerved, netted, coriaceous, very smooth, and from four to six

and a half inches long by one or two inches broad. The *flowers* are dioecious and in spikes at the end of the branches, opposite the leaves, on peduncles the length of the petioles. *Fruit* globose, rather longer than black pepper, on pedicels from four to six lines in length.

History.—Piper Cubeba is a native of Java, Prince of Wales, and other East India Islands, where it grows wild in the woods. The dried unripe fruit is the officinal portion; it is generally imported with the peduncles attached. The fruit or berries are nearly globular, about the size of a small pea, rough, blackish or grayish-brown, of a rather agreeable aromatic odor, and of a hot, bitterish, somewhat camphoraceous taste, leaving a peculiar sensation of coolness in the mouth, similar to that caused by the oil of peppermint. The peduncles or stalks are continuous with raised veins that run over the surface of the berry, and embrace it like a network. The sarcocarp is thin; the shell is hard, almost ligneous, containing within it one loose spherical seed, covered with a blackish coat, but white and oleaginous internally. The powder of cubebs is dark-colored, and of an oily aspect. Cubebs contain a green volatile oil, a ceruminous substance, a yellow volatile oil, a balsamic resin, cubebin, chloride of sodium, extractive, and lignin. The volatile oil is officinal. Age deteriorates the properties of cubebs in consequence of the evaporation of their volatile oil; hence, it is better to keep them whole, pulverizing them when dispensed.

Cubebin, was first obtained by Casola; it is a neutral substance, and may be obtained by expressing cubebs from which the oil has been distilled, preparing with them an alcoholic extract, treating this with a solution of potassa, washing the residue with water, and purifying it by repeated crystallizations in alcohol. Thus prepared, it is white, inodorous and insipid, not volatilizable by heat, almost insoluble in water, slightly soluble in cold alcohol, freely so in that liquid when hot, and soluble also in acetic acid, ether, and the fixed and volatile oils; although bearing a close resemblance to piperin, it differs from it in containing no nitrogen.

Properties and Uses.—Cubebs are mildly stimulant, expectorant, stomachic, and carminative. They act more particularly upon mucous tissues, arresting excessive discharges, especially from the urethra. In large doses they accelerate the circulation, increase the temperature of the system, and occasionally produce headache and giddiness; with these effects they likewise in most instances, cause an increased flow of urine, to which they impart a peculiar odor. They have been employed successfully in gonorrhea, gleet, and sometimes in leucorrhea, and catarrh of the urinary bladder; if not speedily useful, their use should be discontinued. They are contra-indicated during a high inflammatory condition, and are advised to be used in gonorrhea only when the inflammation is confined to the mucous membrane of the urethra. They

have also been recommended in piles, abscess of the prostate gland, and chronic bronchial inflammation. Their use sometimes occasions nausea or vomiting, and is frequently attended, like copaiba, with an ephemeral synocha, followed by a prompt cessation of the gonorrheal discharge; in which disease they may be given in powder along with water or milk, or made into a paste with copaiba. The following preparations have been successfully used in gonorrhea and gleet;—1. Take of Ethereal extract of Cubebs, Solidified Balsam of Copaiba, and Carbonate of iron, of each, two drachms, Podophyllin half a scruple. Mix, and divide with pills of four grains each, of which one or two may be given three times a day. 2. Take of pulverized Cubebs, Podophyllum, white Pond Lily, of each, half an ounce, Holland gin one pint. Macerate for several days, and give sufficient doses three times a day to act slightly on the bowels. 3. Take of Solidified Copaiba two ounces, Ethereal extract of Cubebs one ounce, Oil of Juniper, a sufficient quantity. Mix, and divide into pills of four grains each, of which one or two may be taken three times a day. Dose of Cubebs in powder, from half a drachm to a drachm, three times a day; of the tincture two fluidrachms; of the oil from ten to thirty drops.

Off. Prep.—Extractum Cubebæ Fluidum; Oleum Cubebæ.

PIPER LONGUM.

Long Pepper.

DRIED SPIKES.

PIPER NIGRUM.

Black Pepper.

Nat. Ord.—Piperaceæ. *Sex. Syst.*—Diandria Trigynia.

DRIED UNRIPE BERRIES.

Description.—Piper Longum has a woody, perennial root, with many, creeping, jointed, round stems, downy when young. *Branchlets* bearing the fruit erect, with the leaves sessile, or nearly so. *Leaves* on the creeping branches largest, stalked, broad-cordate, seven-nerved; on the erect fruit-bearing branchlets amplexicaul, oblong-cordate, five-nerved; all smooth, somewhat wrinkled, pale-green below. *Stipules* of the petioled leaves two, adhering to the petiole, and lanceolate; of the sessile leaves intrapetiole, single, spathiform. Fertile *flowers* or *catkins* in sessile spikes, opposite a leaf, stalked, erect, cylindrical, imbricated with five or more spiral rows of small, orbicular scales. *Ovaries* sessile, sub-orbicular. *Stigma* three or four-lobed. Spike of ripe fruit, sub-cylindrical, composed of firmly united one-seeded drupes.

PIPER NIGRUM is a perennial vine with a trailing or climbing stem, round, smooth, shrubby, flexuose, dichotomously branched, jointed,

swelling at the joints, and often throwing out radicles there which adhere to bodies like the roots of ivy, or become roots striking into the ground. The *leaves* are from four to six inches long, alternate, distichous, broad-ovate, acuminate, of a dark-green color, shining above, paler beneath, five to seven-nerved, the nerves connected by lesser transverse ones or veins, and prominent beneath; *petioles* round, from half an inch to an inch long. The *flowers* are small, whitish, sessile, in spikes opposite the leaves, mostly toward the extremities of the branches, pedunculate, from three to six inches long, slender, drooping, apparently some male, others female, while sometimes the flowers are furnished with both stamens and pistils; *stamens* three. *Fruit* ripening irregularly all the year round, sessile, the size of a pea, at first green, then red, and afterward black, covered by pulp.

History.—PIPER LONGUM is a native of South-eastern Asia, and is cultivated in Bengal, and many parts of Hindostan. The female spikes, dried in the sun, form the long pepper of the shops. Miguel has separated this plant from the genus *Piper* and placed it in a new one, *Chavica*; he states that the Long Pepper is obtained from three species, viz: *Chavica Pepuloides*, *Chavica Roxburghii*, both of which are found in a wild state in India, are cultivated in Bengal, and furnish the Long Pepper of India; and the *Chavica Officinarum*, a native of the Philippine and Sunda Islands, and which yields the Long Pepper of Sumatra and Java.

The *India Long Pepper* is cylindrical, an inch or more in length, indented on its surface, of a dark-gray color, a weak aromatic odor, and a pungent fiery taste, but inferior to black pepper. The *Java Long Pepper* is very aromatic, having a pungent aromatic taste stronger than that of black pepper; they are of a grayish-brown, or grayish-cinnamon color, thick, cylindrical, somewhat narrowed toward the apex, thick at base, and faceted with a sort of network, of the projecting apices of the berries; their stalk is roundish, compressed, somewhat woody, curved, and almost smooth. Long-pepper contains a pungent concrete oil or soft resin, aromatic volatile oil, and *piperin*. Its medical virtues are the same as Black pepper, but it is very little employed in this country, either as a condiment or in medicine.

PIPER NIGRUM is a native of various parts of the East Indies, and is extensively cultivated in Sumatra, Java, Malabar, etc. The plant is propagated by cuttings, and begins to bear fruit in three or four years from the time of planting. The berries are gathered before they are quite ripe, and dried in the sun, when they become black and wrinkled, in consequence of the drying of the pulp over the seed. If permitted to ripen, and macerated in water, so as to permit the removal of the outer coat, they form *white pepper*, which is less pungent and aromatic than the black pepper. Black pepper is principally imported from Sumatra and Java. The dried berries are about the size of a small pea,

roundish, somewhat wrinkled, dark brownish-black externally, whitish internally, with a peculiar, aromatic odor, and a hot, spicy, pungent, bitterish taste. Alcohol or ether extracts their virtues, and water only partially. They contain an acrid concrete oil, or soft resin of a green color, a balsamic volatile oil, a colored gummy substance, an extractive matter precipitated by infusion of galls, bassorin, uric and malic acids, lignin, various salts, and piperin. The activity of black pepper probably depends upon its acrid, green concrete oil, and its volatile oil, which is limpid, colorless, becoming yellow by age, of a strong odor, and an acrid taste, less so, however, than that of the pepper, and consists of ten equivalents of carbon, and eight of hydrogen; with muriatic acid it forms a liquid compound. The concrete oil is soluble in alcohol or ether.

Piperin was discovered by Professor Ørsted of Copenhagen, Denmark. It may be obtained by treating pepper with alcohol, filtering and evaporating the tincture to the consistence of an extract, submitting this extract to the action of an alkaline solution by which the oleaginous matter is converted into soap, washing the undissolved portion with cold water, filtering, and treating the matter left on the filter with alcohol, and allowing the solution thus obtained to evaporate spontaneously, or by a gentle heat. Crystals of piperin are deposited and may be purified by alternate solution in alcohol or ether, and crystallization. As ordinarily procured, the crystals of piperin are yellow; when perfectly pure they are colorless, transparent, inodorous, and nearly tasteless, fusible at 212° , insoluble in cold water, slightly soluble in boiling water, which deposits it on cooling, soluble in alcohol, ether or acetic acid, decomposed by the concentrated mineral acids, becoming of a blood-red color with sulphuric acid, and with the nitric becoming first greenish-yellow, then orange, and finally red. It consists of nitrogen, carbon, hydrogen and oxygen, and its formula, according to Wertheim, is $N_2 C_{70} H_{37} O_{10}$. It is supposed to be a neutral substance.

Properties and Uses.—Black pepper is a warm carminative stimulant, capable of producing general arterial excitement. Its chief medicinal use is to excite the languid stomach, and correct flatulence, and is sometimes added to quinia in cases where the stomach is not susceptible to quinia alone. It has been recommended as a remedy in intermittents, but very often fails. *Piperin* is occasionally employed in intermittent fever, but will be found less efficient than the alcoholic extract of black pepper. Its use has also been advised in colic, diarrhea, cholera, scarlatina, chronic gonorrhea, and in solution as a wash for tinea capitis. Piperin should not be administered with astringents, as it is thereby rendered nearly inert. Dose of Black pepper from five to twenty grains; of piperin, from one to eight grains.

Off. Prep.—Unguentum Piperis Nigri.

PISTACIA LENTISCUS.

Lentisk.

Nat. Ord.—Anacardiaceæ. *Sex. Syst.*—Dioecia Pentandria.

THE CONCRETE RESINOUS EXUDATION. MASTICH.

Description.—The *Lentisk* or mastich tree, is a small shrub, seldom more than twelve feet in height, and eight or ten inches in diameter; it is covered with a smooth, brown bark, and toward the top sends off numerous branches. The leaves are evergreen, petiolate, and abruptly pinnate; the leaflets are from eight to twelve in number, usually alternate, with the exception of the two upper which are opposite, oval, lanceolate, entire, obtuse, often mucronate, dark-green above, paler beneath, and sessile upon the common petiole which is winged on each side. The flowers are very small, dioecious, and in single axillary racemes. In the males, the calyx is divided into five minute, ovate segments; stamens five, very short, with large, brown, and quadrangular anthers. The females are placed alternately on the peduncle, and their calyx consists of three small, scale-like segments. The ovary is ovate, and supports three styles, with reflexed, clavate stigmas. The fruit is a smooth, reddish, obovate drupe, about the size of a small pea, containing a smooth nut.

History.—This plant is a native of the South of Europe and the Levant; it flowers in April and May. Its wood is hard and yellowish, and is sometimes used in the arts; the kernels of the nut are edible, and furnish an oil which is used in Spain and other places for burning. It is principally cultivated for its resinous juice, known as *Mastich*, the greater part of which is obtained from the island of Scio. It is obtained by making transverse incisions in the trunk and principal branches, during the month of August; from these the juice slowly exudes, and hardens in tears upon the bark, or drops upon the ground where it is received upon cloths, or upon the bare ground, and concretes in irregular masses. There are two kinds of it in commerce, the Picked Mastich, and Mastich in Sorts. The former is the finest variety; it is in tears of various sizes, oval, roundish, or elongated, frequently flattened, smooth, pale-yellow, translucent, usually covered with a whitish dust from attrition, brittle and easily pulverized, and of a shining fracture. The Mastich in Sorts is a coarser kind, and is composed of many tears agglutinated together, varying in color from pale-yellow, to grayish-brown, and black, together with fragments of wood, bark, and earthy matter intermingled.

Mastich has a faint, agreeable, balsamic odor, which is increased by heat or friction; its taste is weak, agreeable, and somewhat terebinthinate; when chewed it becomes soft, ductile, whitish-gray, and opaque, and after a time slightly acrid. At a moderate heat it melts, and at a higher temperature it burns with a clear flame and balsamic fumes. Its

specific gravity is 1.074. It is insoluble in water, but is wholly soluble in ether, chloroform, and oil of turpentine, and scarcely soluble in the fixed oils. Boiling alcohol dissolves from it a resinous acid, to the amount of nine-tenths of its weight, and leaves a white, ductile substance, somewhat resembling caoutchouc in its properties, and which is soluble in ether, or boiling absolute alcohol. This substance softens and swells up in alcohol, as gluten does in water, and becomes brittle on drying; it is termed *Masticin*. Mastich consists chiefly of resin, with masticin, and a minute proportion of volatile oil. It is occasionally adulterated with sandarach, olibanum, and other resinous bodies; and in seasons of scarcity with sea-salt.

Properties and Uses.—Mastich is seldom employed in medicine. The Turks use it as a masticatory to sweeten the breath and strengthen the gums. It is sometimes employed by dentists to fill the cavities of decayed teeth. The following preparation is recommended for this purpose: Take of pulverized mastich nine parts, sulphuric ether four parts, mix, and digest for several days, strain it through a cloth, and add native alum, in fine powder, a sufficient quantity to form a plastic mass, with which vials holding about two drachms are to be filled, having first poured into each about thirty grains of camphorated alcohol, and fifteen of essence of cloves. This stopping introduced in the cavity of a carious tooth, first well cleansed and dried, is extremely useful on account of the great degree of hardness it acquires. Dissolved in alcohol or oil of turpentine mastich forms a brilliant varnish. An ounce of mastich and half a drachm of caoutchouc macerated in four fluidounces of chloroform, and when dissolved, filtered in close vessels, forms a varnish much esteemed by microscopists.

PIX LIQUIDA.

Tar.

History.—The impure turpentine procured by burning from the wood of *Pinus Palustris* and other species of *pinus*. It has a peculiar empyreumatic odor, a bitterish, resinous, somewhat acid taste, a color almost black, and a tenacious consistence between that of a liquid and solid. It is dissolved by alcohol, ether, the fixed and volatile oils, and yields a small proportion of its medicinal virtues to water. It consists of resinous matter united with acetic acid, oil of turpentine, and various volatile empyreumatic products, and colored with charcoal. By distillation it yields *pyroligneous acid*, and an empyreumatic oil called *Oil of Tar*, which contains *oil of turpentine*, *paraffine*, *eupione*, *creosote*, upon which probably its medicinal virtues depend, *picamar*, the principle to which its bitterness is owing, *capnomor*, and *pittacal*. The solid black mass left after the liquid parts have been evaporated, is called *Pix Nigra*, or *Black Pitch*; it has a shining fracture, softens, and becomes adhesive with a

moderate heat, melts in boiling water, and consists of the unaltered pine-resin, and various empyreumatic resinous products which have received the name of *pyretin*.—*U. S. Disp.*

Tar is prepared in large quantities in North Carolina and Virginia; and in smaller quantities in New Jersey, New England, and West Pennsylvania, from the *Pinus Rigida*, or pitch pine. For Burgundy Pitch, *Pix Burgundica*, see *Abies Excelsa*; and for Canada Pitch, or gum hemlock, *Pix Canadensis*, see *Abies Canadensis*.

Properties and Uses.—Similar to those of the turpentine. Used in chronic coughs, chronic bronchial inflammation, ichthyosis, and the vapor has been serviceable in cases of bronchial disease, by being inhaled into the lungs. Externally, in the form of an ointment, it has proved an efficient remedy in tinea capitis, and some cases of psoriasis; also in foul and indolent ulcers. A *tar water* has been recommended in cough and bronchial affections, prepared as follows: To half a gallon of boiling water, add one pint of tar and one pint of honey; stir the mixture, and when cold, strain off the liquid. It is stimulant and diuretic, and may be taken three or four times a day, in doses of a wineglassful. It will also be found beneficial as a wash in some forms of cutaneous disease.

Pix Nigra has been used in doses of from ten to sixty drachms in ichthyosis and other cutaneous affections—it may be given in pill form. In piles it has been used with great advantage in the form of the following ointment: take of pitch, wax, resin, each, ten ounces, olive oil, one pint. Melt them together, and express through linen, and when nearly cool, stir in four ounces of Scotch snuff.

Off. Prep.—Emplastrum Picis Compositæ; Unguentum Piperis Nigri.

PLANTAGO CORDATA.

Water Plantain.

Nat. Ord.—Plantaginaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE ROOT.

Description.—This is an indigenous perennial plant, known likewise as the *Heart-leaved Plantain*. It is an acaulescent herb, with stout, naked *scapes*, growing from one to two feet in height. The *leaves* are radical, cordate-ovate, broad, smooth, somewhat toothed, thickish, about six inches long, six or eight-ribbed below with a thick midrib, and on long stout petioles. The *flowers* are small, whitish, somewhat imbricate, the lower ones scattered, and on elongated spikes which are from six to eight inches long; *bracts* ovate, obtuse. *Calyx* and *corolla* lobes, very obtuse. *Pyxis* a third longer than the calyx, two-celled, with two seeds in each cell.

History.—This plant grows in moist places, and along the banks of rivers, from New York and New Jersey to Tennessee; also from Ohio to

Wisconsin, and flowers from April to August. The root is the part used, and yields its properties to water; it has not been analyzed.

Properties and Uses.—The root of *Plantago Cordata* is astringent, anodyne, antispasmodic, and anti-emetic. The decoction and extract have been successfully used in Asiatic cholera, checking the disease in a short time; they have likewise proved beneficial in dysentery. The plant is certainly deserving more extended investigation. A poultice of the roots is recommended as an application to old, indolent ulcers, bruises, wounds, etc.; it allays inflammation, and reduces swelling.

Off. Prep.—*Extractum Plantaginis Cordatæ Hydro-alcoholicum.*

PLANTAGO MAJOR.

Plantain

Nat. Ord.—Plantaginaceæ. *Sex. Syst.*—Tetrandria Monogynia.

ROOT AND TOPS.

Description.—This is a perennial acaulescent plant with a round *scape* from one to three feet in height, arising from a fibrous *root*. The *leaves* are ovate, smoothish, somewhat toothed, five to seven-nerved, each of which contains a strong fiber, which may be pulled out, and abruptly narrowed into a long, channeled petiole. The *flowers* are white, very small, imbricated, numerous, and are densely disposed on a cylindrical spike from five to twenty inches long. Small plants are frequently found with the spikes only half an inch to two inches long, and the leaves and stalks proportionally small. *Stamens* and *styles* long; *seeds* numerous.

History.—Plantain is a well known herb, growing in rich moist places, in fields, by the roadsides, and in grass-plats, and common in Europe and America. It flowers from May to October. The root has a sweetish, saline taste, and the leaves are saline, bitterish, and austere. Water or alcohol extracts the virtues of the plant; it has not been analyzed.

Properties and Uses.—Plantain is refrigerant, diuretic, astringent, alterative, and antiseptic. The tops and roots in strong decoction, have been highly recommended in syphilitic, mercurial, and scrofulous diseases, in the dose of from two to four fluidounces, three or four times a day. It is likewise reputed beneficial in menorrhagia, leucorrhea, hematuria, diarrhea, dysentery, and hemorrhoids. The juice taken internally, in doses of one fluidounce every hour, and also applied to the wound, is in high repute as an antidote to the bites of venomous serpents, spiders, and insects. Externally, the bruised leaves, or an ointment made with them, is useful in wounds, ulcers, ophthalmia, salt-rheum, erysipelas, and some other cutaneous affections. The best form of administration is the juice dissolved in diluted alcohol, and evaporated by gentle heat to the consistence of an extract.

PLUMBI ACETAS.

Acetate of Lead.

Preparation.—Acetate of Lead is likewise known by the several names of *Sugar of Lead*, *Superacetate of Lead*, *Saccharum Saturni*. It is prepared by placing thin lead plates in shallow vessels containing distilled vinegar, or diluted pyroligneous acid, and turning them occasionally so as to bring different portions of the metallic surface in contact with the air. In this way the metal protoxidizes, and a saturated solution of the protoxide is formed, which, by evaporation and crystallization, yields the acetate. This process furnishes a perfectly neutral salt. Another mode consists in dissolving, by the aid of heat, litharge, or the protoxide of lead obtained by calcination, in an excess of distilled vinegar or of purified pyroligneous acid, contained in leaden boilers. The oxide is rapidly dissolved, and when the acid has become saturated, the solution is transferred to other vessels to cool and crystallize. After the formation of the crystals, the mother-waters are decanted, and by a new evaporation made to yield another crop, which are usually yellow, but may be whitened by repeated solutions and crystallizations.

History.—Acetate of lead is extensively manufactured in Germany, Holland, France, England, and in the United States. It is a white salt, crystallizing in transparent, brilliant needles, which have the shape of long prisms, terminated by dihedral summits. It has an acetous odor, and a sweet taste followed by strong astringency. It slowly effloresces when exposed to the air, at the same time parting with a little of its acid. It is soluble both in water and alcohol; cold water dissolving from one-fourth to three-fifths of its weight. Carbonic acid water, as well as common water, which uniformly contains this acid, produces a slight precipitate of carbonate of lead with the acetate, which interferes with the clearness of the solution; this may be removed or prevented by the addition of a small portion of vinegar, or of acetic acid. Acetate of lead ought to dissolve entirely, and form a clear solution, in pure distilled water, free from carbonic acid. Sulphuric acid, or a soluble sulphate, when added to a solution of the acetate of lead, produces instantly a precipitate of sulphate of lead, the acid disengaging, at the same time, acetic vapors. When heated, the salt fuses in its water of crystallization; at a heat of 320° its whole water, with a small proportion of its acid, is speedily discharged, and a heavy white opaque mass remains; a higher heat fuses it again, decomposing it, and disengaging acetic acid, and pyro-acetic spirit or acetone; a still higher temperature leaves a residue of charcoal and reduced lead. In the air-pump vacuum, and with the aid of sulphuric acid or quicklime to absorb water as it escapes, the acetate of lead falls into a white powder, which is completely anhydrous. Acetate of lead possesses the important property of dissolving

a large quantity of the protoxide of lead. It consists of one equivalent of acetic acid 51, one of protoxide of lead, 111.6, and three of water $27=189.6$; its formula is $(C_4 H_3 O_3 + PbO + 3HO, \text{ or } \bar{A} + PbO + 3Aq.)$

Acetate of lead is *incompatible* with all acids, and with those soluble salts formed from them, which produce, with protoxide of lead, insoluble, or sparingly soluble compounds. Acids of this character are the sulphuric, muriatic, citric and tartaric. It is also decomposed by lime-water, and by ammonia, potassa, and soda; the two last, if added to excess, dissolving the precipitate at first formed. It is decomposed by hard water, in consequence of the sulphate of lime and common salt which such water usually contains. With sulphureted hydrogen, it gives a black precipitate of sulphuret of lead; with iodide of potassium, a yellow ore of iodide of lead; and with carbonate of soda, a white one of carbonate of lead.

Properties and Uses.—Acetate of lead in doses of from one to three grains, repeated every two or three hours, is a powerful astringent and sedative; it is usually given in pill form. In large doses it is an irritant poison; and in long continued small doses it may induce the peculiar constitutional action of the preparations of lead. Its best antidote is sulphate of soda, sulphate of magnesia, or phosphate of soda, which should be followed by emetics if necessary, and then by alternate purgatives and opium. Generally an overdose is followed by vomiting, which prevents any serious injury, and as long as the bowels are kept regular, its remote constitutional effects are less apt to occur. Large doses, even two hundred and forty grains, have been swallowed, without proving fatal. It is much employed internally among Allopathic practitioners, in hemorrhages from the lungs, intestines, and uterus,—in some forms of diarrhea, and dysentery,—in cholera infantum—in the colliquative diarrhea of phthisis combined with opium—in severe mercurial salivation, and in irritability of the stomach attending certain fevers.

It is never used internally by Eclectics, but is occasionally employed externally, in solution, in cases of superficial inflammations, as in erythema, erysipelas, spreading inflammation of the subcutaneous cellular tissue, and in many cutaneous diseases. The solution may be made by dissolving a drachm of the salt in five or eight fluidounces of distilled water, to which a fluidrachm of distilled vinegar may be added to prevent the oxide from being thrown down. As a collyrium the usual strength is one or two grains to the ounce of water. In inflammations opium is often conjoined with it, four grains of each being added to every fluid-ounce of water. So much improvement has been recently made in Eclectic practice, that we believe even the external use of this agent can be, in a great measure, dispensed with.

Off. Prep.—Lotio Myrrhæ Composita.

PLUMBI OXIDUM RUBRUM.

Red Oxide of Lead.

Preparation.—Red Oxide of Lead, also known by the name of *Red-lead*, *Minium*, etc., is prepared on a large scale by the manufacturing chemists. It is obtained from the protoxide of lead, (*yellow massicot*,) by exposing it, under the access of air, to a temperature just short of what is required to cause fusion, stirring it occasionally for a day and a half or upward, and allowing the product to cool slowly. The French prepare it in tin boxes, closed from the air, and heated nearly to redness, and then gradually allowed to cool. Red-lead, to be of good quality, should be made in large quantities at a time, and should be allowed to cool slowly; this is important, for, as the absorption of oxygen, by which it is formed, takes place during a particular interval of temperature only, it is necessary that the heat within that interval should be maintained sufficiently long to allow all the protoxide to absorb its appropriate amount of oxygen.

History.—Read-lead is a heavy, scaly, tasteless powder, of a bright scarlet color, with a slight tinge of orange. Heat renders it darker, and when raised, fuses it, with the disengagement of oxygen, and its re-conversion into protoxide. Its specific gravity is about 9. It is insoluble in water. Nitrous acid dissolves it entirely, forming nitrate of protoxide of lead; because the excess of oxygen in red-lead converts the nitrous into nitric acid. Diluted nitric acid instantly renders it dark-brown, resolving it into two oxides, one of them the protoxide, which is dissolved, and the other the peroxide or binoxide, which remains. It is sometimes adulterated with red oxide of iron, or red-bole, substances which may be detected by dissolving the suspected red-lead in nitric acid, and testing with tincture of galls. This reagent will produce a black precipitate, in consequence of the iron present in the substances mentioned. If powdered brick be present, it will be left undissolved, upon treating the suspected specimen with nitrous acid, which dissolves the lead and leaves the impurity; or if boiled in water with sugar, and a small quantity of nitric acid, a similar result will take place. When free from impurities, it is completely reduced on charcoal, by means of the blowpipe, into a globule of metallic lead. When treated by nitric acid, it is resolved into protoxide which dissolves, and peroxide which remains insoluble. Chemists differ as to the constitution of red-lead; it is generally considered to consist of three equivalents of lead and four of oxygen, so united as to constitute it a compound of two equivalents of protoxide, and one of peroxide or plumbic acid ($2\text{PbO} + \text{PbO}_2$) that is, 223.2 parts of the former oxide, and 119.6 of the latter.

Properties and Uses.—The only purpose for which this article is used, is in the formation of plasters, as for instance, the *Black Plaster*, or *Black*

Salve, a beautiful and efficacious agent in cuts, wounds, ulcers, some cutaneous affections, etc.

Off. Prep.—Emplastrum Plumbi Compositum; Unguentum Plumbi Compositum.

PODOPHYLLUM PELTATUM.

Mandrake.

Nat. Ord.—Berberidaceæ, *Brown*; Podophylleæ, *Lindley*. *Sex. Syst.*—Polyandria Monogynia.

THE RHIZOMA, OR ROOT.

Description.—This plant is also known by the several names of *May-apple*, *Wild-lemon*, *Raccoon-berry*, *Wild Mandrake*, etc. It is indigenous and herbaceous, with a perennial, smooth, creeping, jointed *root*, several feet in length, about a quarter of an inch thick, brown externally, yellowish within, and furnished with radicles at the joints. The *stem* is simple, erect, round, smooth, about a foot in high, invested at its base by the sheaths which covered it when in bud, and divided at top into two round petioles from three to six inches long; each petiole supports a large, peltate palmate *leaf*, smooth above, slightly pubescent beneath, deeply divided into five, six, or seven lobes, which are wedge-shaped, two-parted, yellowish-green above, paler below, and irregularly incised at their extremities. In barren stems which support but one leaf, the peltate character is the most perfect. The *flower* is solitary in the fork of the stem, on a round nodding peduncle one or two inches long, white, large, about two inches in diameter, and somewhat fragrant. The *calyx* consists of three oval, obtuse, concave, deciduous *sepals*, which cohere in the bud by their scarious margins. The *corolla* is composed of from six to nine white, obovate, obtuse, smooth, concave *petals*, curiously netted with delicate, transparent veins. *Stamens* from nine to twenty, shorter than the petals, curving upward, with yellow, oblong *anthers* of twice the length of the filaments, and not opening by perfect uplifted valves. *Ovary* oval, compressed, obscurely angular. *Stigma* subsessile, convex, its surface rendered irregular by numerous folds and convolutions. The *fruit* is fleshy, ovoid-oblong, one-celled, one or two inches in length, and crowned with the persistent stigma; its fleshy, mucilaginous pulp, has somewhat the flavor of a strawberry, and contains imbedded in it about twelve ovate seeds, all connected to the lateral receptacle by fibers. When ripe the fruit is of a lemon-yellow color, with round, brownish spots.

History.—Mandrake is found in abundance in almost all parts of the United States, in damp and shady woods, and sometimes in dry and exposed situations. It flowers in May and June, and ripens its fruit in September, at which time the leaves wither and fall off. The leaves are said to be poisonous. The fruit has a subacid, sweetish, peculiar taste,

is edible, and slightly aperient, and is very much liked by some persons, but extremely disagreeable to others. The root, which is the officinal part, was well known to the Indians before the whites settled the country, and was one of their most active purgatives; it should be collected for medicinal use soon after the ripening of the fruit. The dried root, as found in the shops, is in pieces of various lengths, about two or three lines thick, with broad, swelling, flattened joints at short intervals, longitudinally corrugated, blackish-brown, or reddish-brown externally, dirty white internally, and furnished with fibers of a similar color to that of the rhizoma. Its fracture is short and irregular, its odor faint and unpleasant, very similar to ipecacuanha, and its taste is sweetish, bitter, and slightly acrid. Its active principles are readily taken up by alcohol, or ether; water takes up a portion of its activity. Analysis has detected in this root gum, albumen, starch, extractive, lignin, gallic acid, fixed oil, traces of volatile oil, salts of potassa and lime, and two resinous principles, one soluble in alcohol or ether, and the other soluble in alcohol only. Both resins are purgative, and probably compose our medicinal *podophyllin*.

Properties and Uses.—The entire plant in its recent state is an irritant poison, producing vomiting, hypercatharsis, tormina, stupor, and bloating of the body; the root, recently dried, operates as a drastic cathartic and emetic, when given in large doses; but the violence of its action is materially modified by age, or roasting. Mandrake is cathartic, emetic, alterative, anthelmintic, hydragogue, and sialagogue. It is an active and certain cathartic, being equal, if not superior to jalap, though operating more slowly. When given in combination with bitartrate of potassa, it induces watery stools, on which account it has been found serviceable in dropsical affections. As a deobstruent, it is one of the most valuable in our *Materia Medica*, acting through and upon all the tissues of the system—and its action continues for a long time. Small doses, repeated at short intervals, to fall short of catharsis, will induce ptyalism with many persons. In bilious and typhoid febrile diseases, it is very valuable as a cathartic, or emeto-cathartic, often breaking up the disease at once. Its cathartic operation is apt to be slow, sometimes remaining twenty-four hours, and producing considerable distress, which is, however, more than compensated for, by the thorough and cleansing manner in which it acts. In chronic hepatitis, there is not its superior in the whole range of medicines, being vastly more useful than mercurial agents, arousing the liver to a healthy action, increasing the flow of bile, and keeping up these actions longer than any other agent with which we are acquainted. In alterative doses, it has been found exceedingly valuable in scrofula, syphilitic diseases, rheumatism, and many other forms of chronic disease. In constipation, it acts upon the bowels, without disposing them to subsequent costiveness. It has likewise been

found very beneficial 'in dysmenorrhea, amenorrhea, incontinence of urine, worms, and some affections of the bladder. Dose of the powdered root, as a cathartic, from ten to thirty grains; of the tincture, from ten to sixty drops; as a sialagogue and alterative, from three to ten grains of the powder, or from five to twenty drops of the tincture. Since the preparation of the *podophyllin* by Mr. W. S. Merrell, the crude drug is seldom employed. The *Podophyllum Montanum* of Rafinesque, having a slender, deeply furrowed stem, the leaves with sharp, bifid segments, palmate, not peltate, with narrow sinuses, and many unequal teeth; the petals six to seven, oblong, obtuse; stamens seven to nine, and berry yellowish oblong, is possessed of similar medical properties.

Off. Prep.—Decoctum Podophylli; Emplastrum Picis Compositum; Pilulæ Aloës Compositæ; Tinctura Podophylli.

PODOPHYLLIN.

The Resinoid or Active Principle of Mandrake.

Preparation.—This is, undoubtedly, as with the major part of our concentrated preparations, an impure resin. It may be prepared by adding a saturated tincture of the root to an equal quantity of water, and distilling off the alcohol; the resin falls to the bottom. The water contains the gum, mucilage, extractive, etc. It may likewise be precipitated without heat by adding a solution of alum to a saturated tincture of the root, but by this process all the resin is not obtained.

I am indebted to the Messrs. F. D. Hill & Co., of this city, for the following process of manufacturing podophyllin, as pursued by them; these gentlemen, in common with all true Eclectics, are very desirous of elevating our school of medicine by all honorable means, and one among these means is opposition to all secret remedies or preparations; and for the prompt and cheerful manner in which they have furnished any information requested of them, they deserve the thanks of the profession. "Exhaust coarsely powdered mandrake root with alcohol, by percolation. Place the saturated tincture in a still, and distil off the alcohol, the residue will be a dark fluid of the consistence of molasses; sometimes it is thicker, and when this is the case add a small portion of it to some water, and if it does not form a whitish yellow precipitate, a small quantity of alcohol must be added to it, or enough to cause the light precipitate. Then warm the thick residual fluid, and slowly pour it into three times its volume of cold water, which must be constantly agitated during the process. If poured in too fast, or without agitation the fluid will fall to the bottom unchanged. Allow it to stand for twenty-four hours; at which time nearly all the podophyllin will be precipitated, the addition of a sufficient quantity of muriatic acid will precipitate the remainder. The precipitated podophyllin, of a whitish yellow color, is

now to be removed and placed on a linen filter, and washed several times with water, to remove any remaining acid, gum, etc.; after which it is to be placed in thin layers on paper, and dried in a room of a temperature between 65° and 90° F., or if in summer at the natural atmospheric temperature—it becomes a shade or two darker by drying in this manner, but if artificial heat be employed to hasten the process, or of a higher temperature, the resin becomes quite dark.”

This valuable agent I had the honor of introducing to the profession several years since. In 1835 I was first led to an examination of the resinous principle of this plant, as well as of the *Iris*, *Cimicifuga*, *Aletris*, and several other plants, in consequence of some information given to me by Professor Tully, of Yale College, New Haven, Conn., relative to the resinous constituent of the *Cimicifuga Racemosa*. And since August, 1835, I have prepared, and used, more or less in my practice, in the treatment of various forms of disease, the resins of *Podophyllum*, *Iris*, *Cimicifuga*, *Aletris*, and several other medicinal plants. In July, 1844, I first called public attention to the resins of *Podophyllum* and *Iris*, in the New York Philosophical Medical Journal, vol. i, No. 7, pages 157–161, in which I recommended the mandrake resin in combination with an alkali, for hepatic diseases, scrofula, dropsy, leucorrhea, syphilis, gonorrhoea, gleet, obstructed menstruation, etc., but of which it appears but little notice was taken by the profession. In April, 1846, I again called the attention of the profession to this, as well as many other concentrated preparations, in the Western Medical Reformer, vol. v, No. 12, pages 175–178. Now, as dates are the only reliable source of correct information in such matters, unless some one can show an earlier notice of these articles, and of their practical utility, than the above, their claims will naturally be considered doubtful. The credit of first preparing podophyllin, and other concentrated preparations, for the use of the profession generally, it being part of his avocation, belongs to Mr. W. S. Merrell, druggist and chemist, of Cincinnati, who, first manufactured it in June, 1847; since which it has become an indispensable and highly important *Eclectic* remedy; and is likewise used by many Allopathics and Homoeopathics, and by the former, in all instances where they have employed it, is preferred to mercurials.

Podophyllin varies in color according to its mode of precipitation, being when precipitated by heat, dark-brown; and when by acid, a light brownish-yellow, or greenish-olive if by alum. It is insoluble in water, oil of turpentine, dilute nitric acid, and dilute alkalies. It appears to be composed of two resins, both of which are purgative, one is soluble in alcohol only, the other in alcohol, or ether. From the presence of gum, or perhaps from an oxidation of the resin (an example of which may be witnessed in the pine-gum), soon after its preparation, a portion of podophyllin ceases to be dissolved by alcohol. It has no alkaline nor acid reaction, but forms a saponaceous compound with the alkalies.

Properties and Uses.—It possesses the properties of the root in a superior degree; from four to eight grains operate as an active emetocathartic, with griping, nausea, prostration, and watery stools; from two to four grains, as a drastic cathartic, with nausea and griping; from one half a grain to two grains, generally operates as an active cathartic, leaving the bowels in a soluble condition; in very small doses, it is gently aperient and alterative. We make use of this agent in those cases where mercurials are used by a certain class of practitioners, and find the result to be vastly in our favor; it fulfills all the indications for which mercurials are recommended and used. The action of podophyllin is very much increased by long trituration, with four or five times its weight of loaf sugar, or sugar of milk (*lactin*). In doses of half a grain, or a grain, it is one of our most valuable cholagogue cathartics, operating mildly yet effectually, arousing the whole biliary and digestive apparatus to a normal action, and which is very persistent in its character. It likewise exerts a favorable influence on the cutaneous functions, producing and maintaining a constant moisture on the skin. In doses of from one-eighth to one half of a grain, or rather in sufficient doses not to purge, it acts as a powerful alterative, and will induce ptyalism in some persons, and is very useful in scrofulous and syphilitic diseases, hepatic affections, dysmenorrhea, rheumatism, gonorrhea, and recent disease of the prostate. It produces a powerful and lasting impression upon the glandular system and secretory organs, unequaled by any other article. It has likewise been found to act as an emmenagogue, and may also be safely and beneficially administered in jaundice, dropsies, dysentery, diarrhea, bilious remittent and intermittent fevers, puerperal fever, typhoid fever, phrenitis, and all glandular enlargements; and in congestive fever it will produce evacuations from the bowels, when mercurials and all other agents fail. There is not a better cholagogue preparation known in medicine, than the combination of podophyllin and leptandrin. It is superior to mercurials or any other preparation of the kind, has an extensive range of application, combines certainty and permanency of action, and is less liable to effect harm, even in the hands of ignorant or injudicious practitioners, than any other known remedy of equal power and energy. In urethral stricture, and recent disease of the prostate, the following pill has cured several cases: Take of podophyllin and iridin of each four grains, alcoholic extract of belladonna, five grains, strychnia, a grain or a grain and a half, conserve of roses a sufficient quantity to make a pill mass. Divide into twenty pills, of which, one may be given for a dose, and repeated three times a day, using in combination with it, active diuretic infusions. Podophyllin should never be given, except in very fine powder, or which is still better, thoroughly trituated with loaf sugar, sugar of milk, ginger, or some soluble extract. Five grains well trituated with sugar of milk, will make ten or fifteen active cathartic doses. When

used alone it is very apt to produce irritation and pain of the stomach, but castile soap, alkalies, or ginger added to it deprives it of most of its irritating and nauseating tendency and disposition to gripe. Caulophyllin combined with it, materially lessens its painful and disagreeable effects. Care should always be taken to proportion the dose of podophyllin to the susceptibilities and condition of the patient, as in some cases half a grain will prove a vigorous emeto-cathartic, while in others it would require twice that amount. When it operates too actively, the administration of alkaline solutions with aromatics internally, and in severe cases by enema, will check it.

Professor R. S. Newton observes, that, "administered in one-fourth or half grain doses, two or three times a day, and continued for several days, it produces an entire change of the secretions throughout the system, especially that of the liver, producing free and copious bilious discharges." He has used it extensively, alone and in combination with leptandrin and cimicifugin.

An Eclectic physician says of this resinoid:—"As a cholagogue cathartic, it probably has no equal in the *Materia Medica*. Its operation is *slow, mild and certain*. It produces a specific action on the liver, arousing it to action, and producing free 'bilious evacuations,' rather of a hydragogue character, but is not liable to produce intestinal irritation, unless given in unnecessarily large doses. It usually takes from six to eight hours for it to operate as a cathartic, unless combined with cream of tartar, or some other article by which its action will be hastened. As a cathartic in all biliary derangements not attended by intestinal irritation, it is a superior remedy. In bilious fevers, either remittent or intermittent, as well as in acute hepatitis or bilious-pneumonia, it not unfrequently arrests the disease at the first prescription if given in a proper manner, or it so far modifies the attack that the case becomes mild and manageable. In chronic hepatic derangements, with dyspepsia, it is a most valuable remedy. Its range of application is perhaps more extensive than any other cathartic medicine, except what is claimed by the old school for mercury. The Podophyllin is a regulator of all the secretions as far as any one remedy can be. It is indicated in *all cases* where according to 'the books,' mercury is indicated, and while in any and every case it will do all the good that mercury can be presumed to do, it is entirely free from any of the objections to that article. The dose varies from one-fourth to one-half a grain, repeated once in two or three hours. The best mode of using it is, to triturate it thoroughly with ten times its weight of pure white sugar, or sugar of milk, and give from one to five grains of the trituration at a dose once in two or three hours, until the proper effect is produced. It will usually operate in about six hours, sometimes in less. If it is desirable to have an operation sooner, add twenty or thirty grains of cream of tartar and one-fourth of a grain of capsicum to each dose. This is not apt to nauseate when first given,

but if the stomach be much deranged or 'bilious,' it will be pretty sure to vomit, though not excessively, about the time its cathartic effect commences. If given alone, however, it is quite sure to operate as an emeto-cathartic, unless the doses be very small, and the intervals between them longer than three hours. As an aperient or alterative, from one-sixth to one-fourth of a grain given evening and morning, or three times a day will generally be sufficient. It is better, however, in all cases to triturate it as before directed, and give the dose accordingly. A combination of one part Podophyllin and ten parts Leptandrin triturated with ten parts of sugar, is an excellent alterative in dyspepsia, hepatitis, etc. As a remedy in puerperal fever, I consider the Podophyllin almost a specific. I prescribe it in one-fourth to one-half grain doses with half a drachm of cream of tartar, to be repeated every two hours until it produces free purging, and in no instance have I had any trouble with the case after its operation."

The late Prof. T. V. Morrow makes the following remarks:—"Perhaps no medicine has been introduced to the notice of the medical profession, for the last one hundred years, which promises to be of so much value as the Podophyllin. An experience somewhat extensive in the use of this agent in the treatment of a great variety of cases of disease, during the last six months, has fully convinced the writer of its immense value as a remedial agent, more especially as a purgative and alterative. To prepare it properly for use, it should be finely pulverized, and given in doses of from one and a half to three grains, to an adult, mixed in a little simple syrup or sweetened water—say in one-half a tablespoonful or about two teaspoonfuls. In doses of this size it will operate with great efficiency and certainty as a purgative, in from four to eight hours, producing several pretty copious and moderately consistent discharges, which are very frequently charged to a considerable extent with bile. In some instances a longer period will elapse before its operation will commence, and in nearly every case it leaves the bowels in a gently lax condition, perhaps for two or three days after its operation is over. It operates with much energy and efficiency, without harshness, seldom producing griping; but it occasionally produces nausea, and, in full doses, may cause vomiting, but in small doses, seldom produces these effects. Some practitioners, who have used the Podophyllin, say it will operate quite satisfactorily as a purgative, in doses of one grain. This is one of the cathartics which, during its operation, seems to exercise a powerfully controlling influence over the condition of the cutaneous tissue, as well as the action of the heart and arteries, producing, in many instances, a moderately copious perspiration, which often continues, to a greater or less extent, during the whole period of its operation. This is more especially true when it causes nausea and vomiting. But when these effects do take place the patients never experience that death-like and powerful depressing sickness, which

not unfrequently results from the operation of the powdered root of the *Podophyllum Peltatum*, when given in full doses. I have found the *Podophyllin* quite a popular and convenient purgative, the dose being so remarkably small that no one objects to taking it on account of its unpleasant and inconvenient size.

In the treatment of the various kinds of intermittent, remittent, and continued forms of fever, I have had frequent opportunities to test its value, during the past summer and fall. With one single dose, of from two to three grains, of this medicine, I have frequently arrested the progress of a severe attack of bilious remittent fever, requiring nothing further to complete the cure, except some gentle tonic and restorative medicine, and a proper avoidance of the exciting causes. The same remarks apply with equal truth to the intermitting forms of fever, as well as to some of the continued. In every variety of case, which is characterized by much hepatic torpor and congestion of the portal circle, it has manifested a superior controlling power, appearing to arouse the torpid energies of the liver, and restoring very promptly its lost functions.

But in no class of cases has this medicine manifested a higher degree of value, so far as I have been able to observe its effects, than in those cases marked by strong determination of blood to the brain, producing either congestion or incipient inflammation of that organ. In several cases of this description, in the treatment of which I have witnessed its effects, I was agreeably surprised to find every trace of congestion eradicated by one or two thorough operations of this article. It seemed to exercise a more completely controlling influence over this pathological condition than any medicine I have ever known used for the same purpose. Of course, in these cases it was used in moderately full doses, and its operations continued for a considerable length of time. In cases of puerperal fever, in their incipient stage, it has manifested itself as a medicine of superior value, arresting them at once, when administered in full doses, and even as a common purgative dose after confinement, no medicine has exercised a happier influence. I have availed myself of its use under these circumstances, in numerous instances, with the most beneficial and satisfactory results. In a case of dropsy of the serous cavities, as well as cellular texture of the whole body, the *Podophyllin* was administered in doses of one-half a grain, in conjunction with half a teaspoonful of *Cremor Tartar*, every two hours, until it produced a half dozen or more copious watery discharges from the bowels, and repeated in two or three days afterward, till the same effects took place, it soon relieved the patient completely of the dropsical effusion!! From its effects in this case I should be led to entertain a favorable opinion of its powers in all cases of dropsy.

I have used the *Podophyllin* in numerous cases of cholera infantum, and other attacks of summer-complaint in children, with very satisfactory results. In these cases, however, it was given in very small doses.

To a child three years old, it was given in doses of from one-fourth to a half of a grain, once in six or eight hours for thirty-six to forty-eight hours, and it scarcely ever failed to afford decided advantage, more especially in those cases in which there was frequent hepatic torpor, in connection with a determination of blood to the head. The results of my experience in the use of this article as a remedial agent, on the whole, are such as to leave no doubt on my mind that it is destined soon to occupy a conspicuous place among the most valuable remedies of the *Materia Medica*, with a very extended range of application in the treatment of disease. As an alterative, it has demonstrated its value beyond all doubt, in numerous cases in which it has been used during the past summer and fall, especially in that class of cases in the treatment of which the routine practitioners of the orthodox school regard the mercurial preparations as of indispensable importance. Indeed, it promises to be more than a substitute for the mercurials, in all those cases in which these medicines have proved of any substantial value, without their liability to produce injurious effects on the constitution of patients."

Off. Prep.—*Pilulæ Baptisiæ Compositæ*; *Pilulæ Copaibæ Compositæ*; *Pilulæ Ferri Compositæ*; *Pilulæ Leptandrini Compositæ*; *Pilulæ Podophyllini Compositæ*; *Pulvis Leptandrini Compositus*; *Pulvis Podophyllini Compositus*.

POLEMONIUM REPTANS.

American Greek-Valerian.

Nat. Ord.—Polemoniaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE ROOT.

Description.—This is an indigenous perennial plant, sometimes known as *Blue Bells*, *Jacob's Ladder*, etc. It has a creeping root, and a smooth, erect, weak, fleshy, diffusely-branched stem from twelve to twenty inches high. The leaves are alternate, and pinnately divided; the leaflets from seven to eleven, ovate-lanceolate, acute, subopposite, smooth, entire, sessile, an inch long and half as wide; the upper leaflets are sometimes confluent. The flowers are numerous, terminal, rather large, nodding, on short petioles, blue, and nearly bractless. The calyx is campanulate, five-cleft; the segments lanceolate-acute, persistent, much shorter than the tube of the corolla. The corolla is rotate-campanulate, limb five-lobed, erect, tube short, closed at the base by five stameniferous valves. Stamens five, equally inserted at the summit of the corolla-tube; filaments slender, declined, hairy-appendaged at the base; anthers introrse. Capsules three-celled, three-valved; cells two to three-seeded.

History.—This is a handsome plant, growing in woods, damp grounds, and along shady river banks, from New York to Wisconsin, bearing blue flowers in May. The root is the part used, and yields its virtues to

water; it has not been analyzed. The *Polemonium Cæruleum*, or Greek-Valerian, is a native of England. It is larger and more numerous-flowered than the above, and is often found cultivated in gardens. The stems are about two feet high, stout, hollow, several from the same root, each dividing at top into a corymbose panicle. The leaves are mostly radical, on long, grooved petioles, pinnately eleven to seventeen foliate; segments sessile, ovate-lanceolate, subopposite, acuminate, oblique, odd one lanceolate. Flowers blue, terminal, suberect. This plant, probably, possesses medicinal virtues similar to the one above.

Properties and Uses.—Alterative, diaphoretic, and astringent. A warm infusion of the root will, it is said, produce copious perspiration, and has been found serviceable in pleurisy, febrile and inflammatory diseases. The tincture, made of whisky, in doses of from one to two fluidounces, two or three times a day, has been found valuable in all scrofulous diseases, and other chronic diseases where an alterative is indicated. The infusion is recommended in bites of venomous snakes and insects, and in bowel complaints requiring the use of astringents. Reported to have cured consumption.

Off. Prep.—Infusum Polemonii.

POLYGALA RUBELLA.

Bitter Polygala.

Nat. Ord.—Polygalaceæ. *Sex. Syst.*—Diadelphia Octandria.

THE ROOT AND HERB.

Description.—This is the *Polygala Polygama* of Walter. It is an indigenous herb, with a perennial, branched, and somewhat fusiform root. The stems are simple, crowded, many from the same root, angular, smooth, and erect, growing from six to twelve feet high. The leaves are linear, oblong, mucronate, smooth, alternate below; linear-lanceolate, obtuse, sessile above. The flowers are crested, purple, and in terminal or lateral racemes; the former are spike-form, loose, with the flowers perfect and winged; the latter are leafless, prostrate or subterraneous, wingless, and nearly apetalous. Wing of the calyx broadly obovate, and longer than the crested corolla. Anthers eight, in two equal parcels. Bracts small, subulate, caducous. Lobes of the caruncle two, scale-like, shorter than the seed.

History.—This plant is a native of many parts of the United States, usually growing in arid, sandy or gravelly soils, and flowering in July and August. The whole plant is officinal; it is inodorous, with a persistent and powerfully bitter taste, which is imparted to water or alcohol. It has not been analyzed. The *Polygala Amara* and the *Polygala Paucifolia*, or Fringed Polygala, possess similar properties, and may be employed as substitutes; the root of the latter has a sweet, pungent, aromatic taste, resembling somewhat that of *Gaultheria*.

Properties and Uses.—In small doses a bitter tonic; in large ones laxative and diaphoretic. An infusion has been found beneficial as a tonic in debility of the digestive organs. It may be used in all cases where a bitter tonic is indicated.

POLYGALA SENEGA.

Seneka.

Nat. Ord.—Polygalaceæ. *Sex. Syst.*—Diadelphia Octandria.

THE ROOT.

Description.—Seneka is an indigenous plant, with a ligneous, contorted, branching and perennial root, which sends up annually several erect, simple, round, somewhat terete, leafy stems, from eight to fourteen inches in height, brownish-red below, and green above. The leaves are alternate or scattered, nearly or quite sessile, lanceolate, acuminate, bright-green above, paler beneath, with scabrous margins, from one to three inches long, and about one-third as wide. The flowers are small, white, slightly crested, on very small pedicels, and arranged in a somewhat dense, terminal, spike-form, filiform raceme, from one to three inches in length. The calyx is five-leaved, with two leaflets wing-shaped, larger than the petals, round-ovate, concave, white, and slightly veined. The corolla is small, closed, having two obtuse lateral segments, and a short-crested extremity. The style is short, somewhat rostrate. The capsules are small, obcordate, invested by the persistent calyx, compressed, two-celled, two-valved. Seeds two, oblong-ovate, acute at one end, slightly hairy, curved, blackish, with a longitudinal, bifid, white strophiole on the concave side. The spike opens slowly, so that the lower flowers are in fruit while the upper ones are in blossom.

History.—Seneka, or *Seneca Snake-root*, as it is usually called, is found in various parts of the United States in woods, and on hill-sides, flowering from June to August. It is found in the greatest abundance in the Southern and Western States, and is rare in the Eastern. The dried root, which is the officinal part, is of various sizes, being from two to five or six lines in diameter; it presents a tuberous head, with the remains of the stems, below which is the tapering, branched, twisted root, often surrounded by ringed protuberances, and carinated along its whole length. The epidermis is corrugated, transversely cracked, of a yellowish-brown color in the young roots, and brownish-gray in the old; the cortical portion is thick, hard, and resinous, and contains the active principles of the root; the central part is ligneous, white, inert, and should be rejected in the preparation of the powder. When fresh, it has a strong, peculiar, nauseous odor, which is scarcely perceptible in the dried root; its taste is at first mucilaginous and somewhat sweetish, followed by pungency, acridity, irritation of the fauces, and a flow of saliva. It imparts its

virtues to water or alcohol; diluted alcohol is its best solvent. The infusion is stronger than the decoction, and should be prepared by displacement in water not exceeding 104° F. in temperature. Too high a temperature renders a portion of the acrid principle insoluble in water, by causing it to unite with the coloring matter and coagulated albumen of the root. It has been analyzed by several chemists, and with variable results; according to the most recent investigations by M. Quevenne, it contains a peculiar acrid principle, named *Polygalic Acid*; a bitter, yellow coloring matter, nearly insoluble in water, but soluble in ether or alcohol; a volatile principle, named *Virgineic Acid*; pectic acid or pectin; tannic acid of that variety which precipitates iron green; gum; albumen; cerin; fixed oil; woody fiber; and various saline and earthy substances. The *polygalic acid* has been variously called Polygalin and Senegin; it contains no azote; is closely analogous to saponin, and is probably the active principle of the root. It may be obtained by the following process of Quevenne: Exhaust powdered seneka by alcohol of 33°, and distil off sufficient alcohol from the tincture to reduce it to the consistence of syrup; treat this with ether to remove the fatty matter, and allow the liquid to stand. It deposits a precipitate which is separated by filtration, and is then mixed with water. To the turbid solution thus formed alcohol is added, which facilitates the production of a white precipitate, consisting chiefly of polygalic acid. The liquid is allowed to stand for several days that the precipitate may be fully formed. The supernatant liquid being decanted, the precipitate is drained upon a filter, and being removed while yet moist, is dissolved by the aid of heat in alcohol of 36°. The solution is boiled with purified animal charcoal, and filtered while hot. Upon cooling it deposits pure polygalic acid. It is a white inodorous powder, of a slight taste at first, but soon followed by pungency, acridity, and pain in the fauces. It is permanent, unalterable in the air, inflammable, slowly soluble in cold, but rapidly so in hot water, soluble in boiling absolute alcohol; which deposits it on cooling, insoluble in ether, the fixed and volatile oils, neutralizes the alkalies, and reddens litmus paper. It consists of carbon, hydrogen, and oxygen.

The *Polygala Sanguinea*, or Caducous Polygala, and the *Polygala Chamæbuxus*, possess similar properties with the Seneka, and may be used as a substitute.

Properties and Uses.—In large doses, seneka is emetic and cathartic; in ordinary doses it stimulates most of the secretions, acting especially as a sialagogue, expectorant, diuretic, diaphoretic, and emmenagogue. It is chiefly employed on account of its expectorant virtues, and is much used in chronic catarrh, and protracted pneumonia, also in humoral asthma, and in the secondary stages of croup. In active inflammation its use is contra-indicated. In relaxed sore-throat it is recommended as

a local stimulant; also as a diaphoretico-diuretic in rheumatism, and as an emmenagogue in amenorrhea. Dose of the powdered root, from ten to twenty grains; of the infusion or syrup, from half a fluidounce to two fluidounces. The extract prepared from an infusion of the root, obtained by percolation, and evaporated to the proper consistence by means of a water-bath, may be given in doses of from one to three grains. Polygalic acid may be given for the same purposes as the root, in doses of from one-fourth to one-half of a grain, dissolved in hot water, with the addition of gum and sugar.

Off. Prep.—Infusum Senegæ; Tinctura Laricis Composita.

POLYGONUM PUNCTATUM.

Water Pepper.

Nat. Ord.—Polygonaceæ. *Sex. Syst.*—Octandria Trigynia.

THE WHOLE HERB.

Description.—This plant, sometimes called *Smart-weed*, is the *Polygonum Hydropiper* of Michaux. It is an annual plant, with a smooth stem, branched, often decumbent at base, slender, jointed, swelling above the joints, of a reddish or greenish-brown color, sprinkled with glandular dots, and from one to two feet in height. The root is white, whorled, and fibrous. The leaves are alternate, lanceolate, petiolate, punctate with pellucid dots, wavy and scabrous on the margin, two or three inches long, and not more than one-fifth as wide; the petioles are sheathing, inflated, fringed. The flowers are small, greenish-white or purple, and are disposed in slender, loose, interrupted, drooping, but finally erect spikes or racemes; bracts remotely alternate. The calyx is four or five cleft, and covered with glandular dots. Stamens six to eight; styles two to three, united at the base and half way up. Fruit either lenticular or three-sided, opaque, roughish. Seed one.

History.—*Polygonum Punctatum*, is a well known, intensely acrid plant, found growing in nearly all parts of the United States in ditches, low grounds, among rubbish, and about brooks and water-courses, flowering in August and September. There are many species of *Polygonum*, but which, although possessing similar virtues, yet differ materially in their medical potency. The whole plant is officinal, and has a biting, pungent, acrid taste, and imparts its virtues to alcohol or water. Age renders it inert, and heat impairs its medical qualities. It should be collected and made into a tincture while fresh. The plant has not been analyzed.

The *Polygonum Persicaria*, called *Ladies' Thumb*, or *Spotted Knot-weed*, possesses similar but inferior medicinal properties, and may be distinguished from the above by the deeper green or purplish color of the

whole plant, a brownish, heart-shaped spot near the center of the leaf, and its rose-colored flowers, in short, dense, terminal spikes. It has a feebly astringent saline taste, and at one time was considered antiseptic.

Properties and Uses.—Water-pepper is stimulant, diuretic, emmenagogue, antiseptic, diaphoretic and vesicant. Highly recommended in amenorrhea, in doses of one fluidrachm of the saturated tincture, two or three times a day, or from four to six grains of the extract. The infusion in cold water has been found serviceable in gravel, colds and coughs, and mixed with wheat-bran in bowel complaints. In Asiatic cholera, the patients wrapped in a sheet moistened with a hot decoction, are said to have been much benefited, and recovered. In combination with sulphate of iron and gum myrrh, it is said to have cured epilepsy—probably dependent on some uterine derangement. Externally, used as fomentation, in gangrene, simmered in water and vinegar; the infusion or a fomentation of the leaves has been beneficially applied in chronic ulcers, and hemorrhoidal tumors, also as a wash in chronic erysipelatous inflammations, as a fomentation in tympanitis and flatulent colic. The fresh leaves bruised with the leaves of Mayweed, and moistened with oil of turpentine, and applied to the skin, will speedily vesicate. The ashes of the plant combined with the ashes of the garden Thyme, *Thymus Vulgaris*, are, it is said, used by many empirics as a solvent for gravel and stone, injected, in solution, into the bladder: hazardous and doubtful treatment. The infusion in cold water, forms an excellent local application in the sore-mouth of nursing women, and in mercurial salivation. The decoction, or infusion in hot water, is not so active as when prepared in cold or warm water. Dose of the infusion, from two to four fluidounces; of the saturated tincture, from one to four fluidrachms three or four times a day—it is said to cause a warmth and peculiar tingling sensation throughout the system, with slight aching pains in the hips and loins, and a sense of weight and tension within the pelvis.

The POLYGONUM ARIFOLIUM, *Sickle-Grass*, *Halbert-leaved Tear-thumb*, or *Hastate Knot Grass*, has a grooved, angled, prostrate, aculeate stem, with reversed prickles, and growing from two to four feet in length. The leaves are halbert-shaped, taper-pointed, long-petioled, from two to four inches long, and about one-half as wide; the petioles are from half an inch to an inch long. The flowers are few, distinct, reddish-white, and are disposed in loose, slender, terminal, racemose clusters; peduncles glandular-bristly; calyx often four-parted, closed; stamens six; styles two, very short; fruit lenticular, large. It grows in low and wet grounds throughout the United States, flowering from June to September. An infusion of this plant in cold water is a powerful diuretic, useful in gravel, strangury, gonorrhea, and all urinary affections; it must be drank freely.

POLYGONUM FAGOPYRUM, or common Buckwheat, may be used as follows to recall the flow of milk in the breasts of nurses, where it has

disappeared for several days: Stir in any quantity of buckwheat flower, a sufficient quantity of buttermilk to form a poultice; warm it, but be careful not to boil or make it hot. Apply it thus warm, over the whole breast and renew it every four or six hours. Sometimes it requires to be thus used for three or four days before its effects are produced; usually, however, twenty-four hours are sufficient.

Off. Prep.—Infusum Polygoni; Extractum Polygoni; Extractum Polygoni Fluidum; Pilulæ Polygoni Compositæ; Tinctura Caulophylli Composita; Tinctura Polygoni.

POLYPODIUM VULGARE.

Common Polypody.

Nat. Ord.—Filices, *Jussieu*; Filicales, *Lindley*; Polypodiaceæ, *Brown*.
Sex. Syst.—Cryptogamia Filices.

THE ROOT AND TOPS.

Description.—This plant is also known by the names of *Rock-Polypod*, *Fern-root*, *Rock-Brake*, *Brake-root*, *Female-Fern*, etc. It has a perennial, creeping, irregular, brown root, with membranous scales extending to the caudex or base of the stipe. The *fronds* are from six to twelve inches high, distiched, green, smooth, deeply pinnatifid, being divided into alternate *segments* nearly to the midvein, which are linear-oblong, obtuse, crenulate, the upper ones gradually smaller, parallel, a little curved, and about a quarter of an inch wide. *Stipe* naked and smooth. The *fruit* on the lower surface of the frond, in large, distinct, golden dots, sori, or capsules, without any indusium, round, in a double row, and becoming finally brownish.

History.—Polypody is common on shady rocks, in woods, and mountains, throughout the United States. The root and tops are used in medicine; the root is rather long, about as thick as a goosequill, somewhat contorted, covered with brown, easily separable scales, furnished with slender radicles, and marked by numerous small tubercles; its color is reddish-brown with a tinge of yellow, its odor disagreeably oleaginous, and its taste peculiar, sweetish, mucilaginous, somewhat bitter and nauseous. Water extracts its properties.

Properties and Uses.—This plant is pectoral, demulcent, purgative, and anthelmintic. A decoction or syrup has been found very valuable in pulmonary and hepatic diseases; and a strong decoction is recommended as a purgative, and for the expulsion of tænia, and other worms. Dose of the powdered plant from one to four drachms; of the decoction or syrup, from one to four fluidounces, three or four times a day.

Off. Prep.—Decoctum Polypodii.

POLYTRICHUM JUNIPERUM.

Hair-cap Moss.

Nat. Ord.—Musci,—Polytrichaceæ. Sex. Syst.—Cryptogamia Musci.

THE WHOLE PLANT.

Description.—This plant, sometimes known as *Bear's Bed*, *Ground Moss*, *Robin's-Rye*, etc., is indigenous, and perennial, with a simple or divided *stem*, more generally simple, slender, of a reddish color, and from four to seven inches in height. The *leaves* are linear-lanceolate, awn-pointed, entire, flattish, appressed, somewhat spreading, the margins inflexed. The *capsule* is oblong four-sided, the angles acute; the *calyptra* is densely hairy and white; the *lid* or *operculum* short-beaked from a convex base; *apophysis* depressed, and discoidal. *Peristome* single, of sixty-four teeth, adherent by their summits to the membranous-dilated apex of the columella. *Inflorescence* diœcious; *sterile flowers* terminal, cup-shaped.

History.—This is an evergreen plant, found on high, dry places, along the margins of dry woods, and exposed places, mostly on a poor, sandy soil, and is of a darker green color than the mosses in general. The leaves are closely set on the stem about one half its length, above which the stem is naked, terminating in a capsule, covered with a white, hairy hood or calyptra. The whole plant is officinal. It yields its properties to boiling water by infusion. It has not been analyzed, but is deserving the especial attention of medical men.

Properties and Uses.—This is a very valuable and important Eclectic agent, which has been in use for a number of years, and is, I believe, unknown to any other class of practitioners. It is a powerful diuretic in strong infusion. In doses of two fluidounces of the infusion, every half hour, it has been known to remove from a dropsical patient from twenty to forty pounds of water in the space of twenty-four hours. It possesses but very little smell or taste, and never produces any nausea or disagreeable sensation in the stomach. It may be used in connection with hydragogue cathartics, or even alone, in dropsies, with the most decided advantage; and is a very useful article in gravel, and all urinary obstructions. Professor Jones considers it worthy to be ranked among the first, if not at the head, of the class of diuretics.

Off. Prep.—Infusum Polytrichi.

POPULUS BALSAMIFERA.

Balsam Poplar.

Nat. Ord.—Salicacæ. Sex. Syst.—Diœcia Octandria.

THE BUDS.

Description.—This tree, also called *Tacamahac*, or *Tacamahac Poplar*, attains the height of from fifty to seventy feet, with a trunk about eighteen

inches in diameter. The *branches* are smooth, round, deep-brown; the *buds* acuminate, smooth, and covered in the spring with an abundance of fragrant, viscid, balsamic juice. The *leaves* are ovate, gradually tapering and pointed, smooth on both sides, with fine glandular serratures, deep-green above, whitish and reticulate-veined beneath, and on long petioles; sometimes two glands at the apex of the petiole. *Scales* dilated, slightly hairy.

History.—This tree is found in Canada, the northern parts of the United States, and in Siberia. In this country it is in blossom in April. The leaf-buds are the officinal part, and should be collected in the spring; they have a peculiar, agreeable, balsamic odor, and a bitterish, balsamic, somewhat pungent taste. The balsamic juice is collected in Canada in shells, and sent to Europe, under the name of *Tacamahaca*. Alcohol or spirits is the proper solvent. They have not been analyzed.

The buds of the *POPULUS CANDICANS*, or *Balm of Gilead*, possess similar virtues with the above. The tree is of less stature than the *P. Balsamifera*, the *leaves* are broader, and heart-shaped, with a distinct sinus at the base—the *petioles* are hairy and the *branches* terete.

Properties and Uses.—Poplar buds are reputed stimulant, tonic, diuretic, and antiscorbutic. A tincture of them has been beneficially employed in pectoral, rheumatic, scorbutic, and nephritic affections. Externally, macerated in oil or lard, they form an excellent liniment or ointment in the treatment of wounds, bruises, tumors, some cutaneous diseases, and in local rheumatism. The bark is said to be tonic and cathartic, and to have proved of service in gout and rheumatism. Dose of a tincture of the buds, from one to four fluidrachms; and is excellent for colds, and pain in the breast.

POPULUS TREMULOIDES.

American Poplar.

Nat. Ord.—Salicaceæ. *Sex. Syst.*—Dioecia Octandria.

THE BARK.

Description.—This tree, also known by the names of *White-Poplar*, and *Aspen*, attains the height of from twenty to fifty feet, with a diameter of from eight to twelve inches. It is covered with a smooth, greenish-white bark, except on the trunks of very old trees. The *leaves* are orbicular-cordate, abruptly acuminate, dentate-serrate, smooth on both sides, pubescent at the margins, dark-green, three-nerved, from two to two and a half inches long, and one and a fourth as wide, and are on long, slender, and laterally compressed petioles, which accounts for the continual agitation of the leaves by the slightest breeze. *Aments* plumed with silken hairs, about two inches long, pendulous, appearing in April,

long before the leaves. *Scales* cut into three or four deep linear divisions, and fringed with long hairs.

History.—This tree is common in Lower Canada, and in the Northern and Middle States. The bark is the officinal part, and should be collected in the spring, just as the sap begins to rise. Its virtues are imparted to alcohol, water, or acetic acid. There are several varieties of this tree, all of which possess similar properties, as the *Populus Grandidentata*, *P. Candicans*, etc.

These trees owe their virtues to two alkaloids, *Populin* and *Salicin*. The process for obtaining *Salicin* is described under its appropriate head. *Populin* may be obtained from the solution, after the *salicin* has been procured, by saturating the excess of sulphuric acid, when the *salicin* has ceased to crystallize, with a concentrated solution of carbonate of potassa. This precipitates the *populin*, which should be pressed between folds of blotting paper, and re-dissolved in boiling water; when, upon the cooling of the liquid, the *populin* will be deposited in the crystalline state. It is very light, purely white, and of a bitter-sweetish taste. When heated, it melts into a colorless and transparent liquid. It is soluble in two thousand parts of cold, and about seventy of boiling water, and in boiling alcohol, acetic acid, or the dilute mineral acids from which alkalies precipitate it unchanged.

Properties and Uses.—Poplar bark is tonic and febrifuge, and has been used in intermittent fever with advantage. An infusion of it is reputed a valuable remedy in debility, emaciation, want of appetite, feeble digestion, faintness at the stomach, chronic diarrhea, and worms. It is said to possess active diuretic properties, and has been beneficially employed in gonorrhea, gleet, strangury, and other diseases of the urinary organs. The large aspen, *P. Grandidentata*, is said to be the most active and bitter. Dose of the powdered bark, one drachm, two or three times a day.

POTASSIUM.

Potassium.

Preparation.—A mixture of carbonate of potassa with finely divided charcoal is first prepared by igniting cream of tartar in a covered crucible, which leaves a mixture, well known as the Black Flux. This, while still warm, is mixed with a considerable proportion of charcoal in coarse powder and small fragments recently ignited, and allowed to cool in a covered crucible. The whole is now introduced into one of the hammered iron bottles used for holding mercury, coated outside with a mixture of sand and clay. The bottle is placed horizontally in a wind furnace, and a short wide tube of iron is fitted to it, to which tube is attached a copper receiver, partly filled with good naphtha, and having a diaphragm of copper, and on the further side of the receiver an aperture for the escape of gas, opposite the tube of the bottle; so that, if

necessary, a strong steel rod may be introduced through this aperture, and another in the upper part of the diaphragm into the tube, for the purpose of cleaning it out as it is apt to become choked. The receiver with the naphtha being surrounded with ice, a steady and uniform strong red or white heat (by means of dry wood, the flame of which plays all round the bottle,) is applied to the bottle, and after a time potassium, which is known by the appearance of its pink flame at the mouth of the tube, distils over, accompanied with carbonic oxide gas, and with a gray powder, which is the cause of the occasional choking of the tube. The potassium drops into the naphtha, which protects it from the action of the air; to purify it entirely, it is re-distilled in a small iron retort along with a little naphtha into a receiver containing that liquid.

History.—Potassium was discovered in 1807 by Sir H. Davy, who obtained it by decomposing the hydrate of potassa by means of galvanism. It was subsequently obtained in larger quantity by Gay-Lussac and Thenard, who placed the fused alkali in contact with iron heated to whiteness, which attracted the oxygen and set free the metal. The common mode of preparing it is given above.

Potassium is a solid, soft, bluish-white metal, having a high degree of metallic luster, but becoming quickly tarnished and oxydized when exposed to the air, from which it absorbs oxygen, and should therefore be kept in naphtha, a liquid which contains no oxygen. It is more ductile than wax, and is easily cut with a knife. Its specific gravity is 0.865, so that it floats on the surface of water; it melts at 136° , its equivalent number is 39.2, and symbol K. When thrown upon water, it swims, takes fire, and burns with a beautiful pink flame, combining with oxygen, and generating potassa which dissolves in the water. It unites with most of the non-metallic elements, and with several of the metals. Metals and metalloids whose attraction for oxygen is too strong to be overcome by the usual means, are isolated by potassium. Thus, it decomposes the oxides or chlorides of aluminum, glucinum, yttrium, thorium, and zirconium, and the boracic and silicic acids. It is found chiefly in the ashes of land-plants, as oxide of potassa united to carbonic acid, and is also obtained as chloride in the ashes of sea-plants. Many rocks, minerals, and soils contain it; indeed, it is necessary to the growth of plants.

Potassium forms two compounds with oxygen, a protoxide, KO, containing one equivalent of oxygen, (*a dry potassa*) of a gray color; and a peroxide KO_2 , containing three equivalents of oxygen, and of a yellowish-brown color. Its protoxide forms the following medicinal salts, acetate, bichromate, carbonate, bicarbonate, chlorate, citrate, hydrate, nitrate, sulphate, sulphureted sulphate, bisulphate, tartrate and bitartrate of potassa. Potassium also forms officinal compounds with various agents, under the names of iodide, bromide, sulphuret, cyanuret, and ferrocyanuret of potassium, each of which will be described under its appropriate head, throughout this work.

POTASSÆ BITARTRAS.

Bitartrate of Potassa.

History.—This salt, commonly called *Cream of Tartar*, in its pure state was unknown until the investigations of Scheele in 1769. It is obtained from the crude tartar, argol, or winestone of commerce, a grayish or brownish obscurely crystalline substance, which becomes deposited on the bottom and sides of casks in which new wine has been kept. The tart wines deposit it in the largest quantity; it is composed of bitartrate of potassa, tartrate of lime, coloring matter, and other accidental impurities. That called *Red Tartar*, is of a reddish color, and is the deposit of red wines; while that named *White Tartar*, is of a dirty-white color, and obtained from white wines. The juice of the grape contains bitartrate of potassa in solution with saccharine matter, and during its fermentation the sugar disappearing and becoming replaced by alcohol, which does not hold the bitartrate in solution, this consequently precipitates as a crystalline crust. To purify this substance, it is pulverized, and then boiled with water, and as soon as the solution is saturated, it is allowed to cool, when a nearly colorless crystalline layer is deposited; this is again dissolved in boiling water, four or five per cent. of pipeclay added to it, and the solution then evaporated to a pellicle. As it cools, the clay and coloring matter subside, and white crystals in crusts are deposited, which become still whiter when placed on linen and exposed to the air. In pharmacy, these are the *crystals of tartar*; and when powdered form the medicinal *cream of tartar*.

Bitartrate of potassa when first prepared is in the form of white cakes, with obscure crystallization on one of the surfaces; the crystals being of small size, and in oblique rhombic prisms. But as more generally met with it is in the form of a fine white powder. The crystals are hard and gritty between the teeth, and do not quickly dissolve in the mouth. In either form, it has a sharp, agreeable, acid taste, an acid reaction, is permanent, soluble in 184 parts of cold water, 18 of boiling, and is insoluble in alcohol. A red heat chars and decomposes it, disengaging empyreumatic oil, pyrotartaric acid, and various gases, and leaving carbonate of potassa with charcoal. The *black flux* of chemists is composed of one part bitartrate of potassa, and half a part of nitrate of potassa, mixed and heated together; a residuum is left of carbon and carbonate of potassa. If the nitre be doubled the carbonate will remain without the carbon, forming *white flux*. Cream of tartar is abundantly soluble in water to which borax or boracic acid has been added, forming a solution, termed *Soluble cream of tartar*. It is *incompatible* with baryta, strontia, lime, and acetate of lead, which precipitate insoluble tartrates, and tartrate of lead. It forms soluble tartrates with salifiable bases, giving rise to double salts. It is composed of two equivalents of acid 132, one of potassa 47.2 and one of water 9=188.2, ($2T+KO+AQ$).

Commercial cream of tartar usually contains from two to five per cent. of tartrate of lime not intended as an adulteration. But it is sometimes adulterated with sand, clay, gypsum, flour, chalk, nitre, alum, sulphate of potassa, chloride of potassium, etc. Sand, clay, and gypsum may be known by their insolubility; flour, by giving a blue color with iodine; chalk, by effervescing with dilute acids; alum, by its astringency; and any soluble sulphate, by the addition of chloride of barium, which occasions a precipitate not entirely soluble in nitric acid. Chloride of potassium may be detected by nitrate of silver, which produces a white flocculent precipitate insoluble in nitric acid.

Properties and Uses.—Bitartrate of potassa is refrigerant, diuretic, and cathartic. In large doses it is apt to give rise to severe and long-continued purging of watery stools,—yet it does not cause griping at the time, nor debility afterward; from this property, as well as its diuretic action, it is very much used in dropsical affections. It is frequently combined with Jalap, the Compound Powder of Jalap, Podophyllin, Sulphur, etc. In solution, sweetened with sugar, it forms an agreeable, refrigerant drink, very useful in many febrile affections. Combined with sulphur, it is used as a laxative, and is often given for some forms of cutaneous disease. Dose, as a cathartic, from four to six drachms; as an aperient, one or two drachms; and in dropsy, it may be given in doses of from one to three drachms, in water, several times a day. Equal parts of Bitartrate of Potassa, Powdered Rhatany Root, and Myrrh, form a good dentifrice. Two drachms of cream of tartar added to a pint of milk, form a *cream of tartar whey*, which when diluted with water is sometimes given in dropsical complaints.

Off. Prep.—Potassæ Carbonas Purus; Potassæ Tartras; Pulvis Ipecacuanhæ Compositus; Pulvis Podophyllini Compositus; Sodæ et Potassæ Tartras.

POTASSÆ NITRAS.

Nitrate of Potassa.

History.—Nitrate of Potassa (Saltpetre, Nitre, Sal-prunelle) is a salt which was known to the ancients, though, probably, not with sufficient accuracy to enable them to determine it from other salts formed on the surface of the soil by efflorescence. It may be artificially manufactured, although it exists naturally in some soils. In many countries it exists already formed; thus, it is found in this country in Ohio, Kentucky, Tennessee, Virginia, and Maryland, generally in caverns situated in limestone rock, and intermixed with nitrate of lime. It is also found in various sections of Europe, in Egypt, in Peru, and other countries; but by far the greater part of the commercial article is obtained from India, where it exists in great abundance. The vegetable kingdom contains a considerable portion of it, having been found in the crawley, sunflower, borage, hemlock, parietaria, bugloss, tobacco, etc.

In India, where it is manufactured, the soil contains about six or seven parts of nitre in a thousand; this is lixivated in an apparatus made for the purpose, and containing wood ashes, which has the effect of converting any nitrate of lime that may be present, into nitrate of potassa. The liquid obtained is then evaporated, filtered, and set aside to crystallize, and furnishes a substance containing from 45 to 70 per cent. of the pure salt. This, when redissolved and again crystallized, is the crude nitre, or crude saltpetre of commerce; it has a dirty yellowish hue, and contains much foreign matter. An essential part of these soils is, that they shall contain decomposing felspar, mica, or other destructible minerals which consist partly of potassa. The production of nitre from them is promoted by the presence of animal matter, but may also go on without it; so that the nitric acid must be formed through the intervention of atmospheric air. The soluble salts of the nitrate soils consist of sulphates, muriates, and nitrates of potassa, lime, and soda. The nitrates are converted into nitrate of potassa by lixiviating the soil over a filter of wood ashes, containing carbonate of potassa, and then duly evaporating the filtered liquor. Nitre is also prepared in many parts of Europe from soils artificially impregnated with animal matter—from the mortar of old buildings—or from artificial composts consisting of animal substances, decaying vegetables, ashes, and chalk, marl, or lime. The nitrate thus in the first place produced is the nitrate of lime, which is converted into the nitrate of potassa by double decomposition with carbonate of potassa; and the salt is then obtained by lixiviation, and purified by repeated crystallization.

On account of the low price of India nitre, but little of the salt is prepared from the native sources of this country; it is chiefly imported from Calcutta, in grass-cloth bags holding from 150 to 175 pounds each. In this country it is refined by our chemists, of which *refined saltpetre* a great portion is exported. The *South American saltpetre*, incorrectly so called, which has been received from Peru within a few years, is a *nitrate of soda*, and is found to be preferable to nitre in the preparation of nitric and sulphuric acids, in consequence of its containing a greater proportion of acid. As it absorbs moisture, it is not adapted to the manufacturing of gunpowder.

Nitrate of potassa forms white, long, striated, translucent crystals, which are six-sided prisms, terminated by one, two, or six converging planes. Its taste is peculiar, cooling, and slightly bitterish. It is permanent in the air, soluble in about two-fifths of its weight of boiling water, soluble in four or five times its weight of water at 60°, sparingly soluble in ordinary alcohol, but insoluble in absolute alcohol. In the act of dissolving it occasions considerable cold. Heat fuses it, and when raised to redness drives off oxygen and converts it into the hyponitrite of potassa. In consequence of this evolution of oxygen, it greatly enlivens combustion when thrown on burning fuel. Chloride of platinum added

to its solution, occasions a yellow precipitate. On account of its liability to hold mechanically a portion of water, within the *large* crystals, it is advised by Berzelius to stir the mixture during crystallization, so as to make it shoot into *small* crystals. When allowed to cool from a state of fusion, either in molds or flat circular cakes, it concretes into a hard, fibrous, opaque, white mass, known in commerce by the name of *Sal Prunelle*, or *Crystal Mineral*. Nitrate of Potassa consists of one equivalent of nitric acid 54, and one of potassa 47.2 = 101.2. ($\text{NO}_5 + \text{KO}$.)

Its most common impurity is salt, which renders it inapplicable to the purpose of making gunpowder. The presence of salt, or of chloride of potassium, may be known by the addition of nitrate of silver to the solution, which will occasion a white precipitate of chloride of silver. If the chloride of barium produces a precipitate, the impurity is a sulphate. If lime be present, the addition of a solution of oxalate of ammonia precipitates the white oxalate of lime. The fracture of pure nitrate of potassa is radiated, the radii being usually large; if 1-80th of common salt be present, it renders the radii smaller; and 1-40th, or more, gives rise to a zone in the body of the mass without any radiated structure, or occasions the entire disappearance of this structure. One hundred grains of dry, pure nitre, treated with sixty grains of sulphuric acid, in a deep platina or porcelain crucible covered to prevent loss during the desiccation of the salt, and the whole kept at a red-heat until it ceases to lose weight, should yield a residue of eighty-six grains of sulphate of potassa; if less than this, and chlorides and sulphates are absent, the nitre probably contains nitrate of soda.

Properties and Uses.—Nitrate of potassa is irritant, cathartic, refrigerant, and diuretic. In doses of from half an ounce to two ounces, in solution, it occasions heat and pain in the stomach, vomiting, excessive nervous depression, and sinking of the pulse; and has proved fatal in a few hours. On account of the uncertainty of its cathartic effects, it is seldom used for that purpose. Its most common actions are to increase the cutaneous and renal secretions, to diminish the temperature of the system and the frequency of the pulse, to keep the bowels in a soluble condition, and, in consequence of these influences, to lessen febrile and inflammatory action. An experiment, in which from one to five drachms of nitre were given daily, in a state of health, and continued for eight or twelve days, resulted in general debility, lowness of spirits, constant drowsiness, and slow and weak pulse, falling, toward the termination of the experiment, at several various times, to twenty beats in the minute. All this time the appetite and digestion continued unimpaired, with occasional pains in the abdomen followed by purging. Nitre is extensively employed as a diuretic, and especially in dropsical affections. It has also been found useful in acute rheumatism, and active hemorrhages; and in such cases the salt may be given in divided doses, to the extent of one or two ounces in twenty-four hours, care being taken to have it

largely diluted with water. In spasmodic asthma it has been administered internally with efficacy; nitrous fumigation has also been found useful in this affection; it is employed as follows: blotting-paper is dipped in a saturated solution of nitre and dried, fire is then applied to it, and the nitrous fumes that are evolved are to be inhaled, continuing the inhalation each time for a quarter of an hour. Nitre is sometimes added to gargles in certain stages of inflammatory sore-throat. It is frequently substituted for the bitartrate of potassa in our Powder of Ipecacuanha and Opium. Sal prunelle has been found useful as an application to chapped lips. The dose of nitre, as a sedative refrigerant, is from ten to twenty grains, well diluted; and as a diuretic, from twenty to sixty grains. Too freely given, or its use too long continued occasions pain in the stomach. No antidote is known to its more serious actions; the treatment consists in speedily evacuating it from the stomach, administering mucilaginous draughts in large quantities, anodynes to relieve pain and irritation, and stimulants to overcome any tendency to prostration.

Off. Prep.— Acidum Nitricum Purum; Collodium; Potassæ Sulphas cum Sulphure; Pulvis Asclepidis Compositus; Spiritus Ætheris Nitrici; Unguentum Sulphuris Compositum.

POTASSII FERROCYANURETUM.

Ferrocyanuret of Potassium.

History.—On the large scale, this salt is prepared by placing a mixture of two parts of pearlash, with five parts of animal matter, such as hoofs, dried blood, old leather, chips of horn, woolen rags, and other substances abounding in nitrogen, into an egg-shaped iron pot, calcining the mixture at a red-heat, and constantly stirring the mass until it ceases to give out fetid vapors. The calcined mass is then cooled, dissolved in water, and concentrated by evaporation so that crystals may form. These are purified by repeated crystallization. It may also be obtained by boiling purified Prussian blue in a solution of potassa, until the blue color disappears, filtering the liquor, evaporating, and crystallizing several times to render it pure.

Ferrocyanuret of Potassium occurs in broken or entire crystals of large size, whose form is usually a rectangular prism, truncated on the ends and edges, or a foursided table derived from the rhombic octaëdre by excessive truncation of the apices. They are transparent, of a lemon-yellow color, permanent in the air, somewhat flexible, inodorous, and possessed of a sweetish-bitter, saline taste. It is soluble in three or four times its weight of cold water, and about its own weight of boiling water, but is insoluble in alcohol. At a temperature of 140° it loses its water of crystallization, leaving a white anhydrous salt. A low red-heat, decomposes it, converting it into cyanuret of potassium, carburet of iron,

and other compounds. The salts of sesquioxide of iron are precipitated of a deep-blue color by it; those of protoxide of iron white, quickly passing to blue; those of zinc and lead white, and of copper chestnut-brown. The precipitates are ferrocyanurets of the respective metals. It emits a hydrocyanic acid vapor when boiled with dilute sulphuric acid. It consists of two equivalents of cyanuret of potassium 130.4, one of cyanuret of iron 54, and three of water 27 = 211.4, (2 K Cy, Fe Cy + 3 HO). In the anhydrous state, it is stated to consist of a compound radicle called *Ferrocyanogen*, which is composed of three equivalents of cyanogen, and one of iron (tercyanuret of iron) combined with two equivalents of potassium, (2 K Cy, Fe Cy), or (Fe Cy₃ + 2 K.)

Properties and Uses.—Ferrocyanuret of potassium is not poisonous, being absorbed and carried off quickly with the urine. “Dr. Burleigh Smart, of Kennebec, Maine, has attributed to this salt valuable medicinal powers. Its primary effect, according to him, is that of a sedative, diminishing the fullness and frequency of the pulse, and allaying pain and irritation. It also acts, under favorable circumstances, as a diaphoretic and astringent. Dr. Smart used it with success in a case of chronic bronchitis in a child, with the effect, in a few days, of diminishing the frequency of the pulse, and of lessening the sweating, cough, and dyspnoea. It sometimes acts as a diaphoretic, but only in cases attended with excessive vascular action, and increased heat of skin. As an astringent, its power is most conspicuous in the colliquative sweats of chronic bronchitis and phthisis. The same power was evinced in several cases of leucorrhœa, cured by its use. It sometimes produces ptyalism, unattended, however, by swelling of the salivary glands, or fetor of the breath. Its properties as an anodyne and sedative, render it applicable to cases of neuralgic pains and hooping-cough, in which diseases, especially the latter, Dr. Smart found it useful. When given in an overdose, he states that it occasions vertigo, coldness and numbness, with a sense of gastric sinking.

“The form of administration which Dr. Smart prefers, is that of solution in the proportion of two drachms to the fluidounce of water. Of this, the dose for an adult is from thirty to forty-five drops, equivalent to from ten to fifteen grains of the salt, repeated every four or six hours. Should the results of Dr. Smart be confirmed by the profession, the ferrocyanide of potassium will form an important acquisition to the *Materia Medica*.”—*U. S. Disp.*

Off. Prep.—Acidum Hydrocyanicum Dilutum; Ferri Ferrocyanuretum; Potassii Cyanuretum.

POTENTILLA CANADENSIS.

Fivefinger.

Nat. Ord.—Rosaceæ. Sex. Syst.—Icosandria Polygynia.

THE ROOT.

Description.—This is a perennial, villose-pubescent plant, frequently known by the name of *Cinque-foil*. It has a sarmentose, procumbent and ascending *stem* from two to eighteen inches in length. The *leaves* are palmately five-foliolate, the *leaflets* obovate, silky beneath, cut-dentate toward the apex, entire and alternate toward the base. *Stipules* ovate, hairy, deeply two or three-cleft, or entire. The *flowers* are yellow, on long, axillary, solitary pedicels. The *calyx-segments* are lanceolate or linear; *bracteoles* of the calyx longer than the segments, and nearly as long as the petals; *petals* obcordate, and longer than the calyx. There are two varieties of this plant, the *Potentilla Pumila*, which is very small and delicate, flowering in April and May, and growing in dry, sandy soils, the stem rising about three or four inches. The other is the *Potentilla Simplex*, which is less hirsute, with a simple *stem*, erect or ascending at base, and oval-cuneiform leaflets; it grows in richer soils to twelve and sixteen inches high, and flowers from June to August.

History.—Five-finger is common to the United States, growing by roadsides, on meadow banks and waste grounds, and flowering from April to October. It is the *Potentilla Sarmentosa* of some botanists. The root is the part used; it has a bitterish, styptic taste, and yields its virtues to water.

Properties and Uses.—This plant is a tonic and astringent. A decoction has been found useful in fevers, bowel complaints, night sweats, menorrhagia, and other hemorrhages; also it is an excellent local application in form of gargle, for spongy, bleeding gums, and ulcerated mouth and throat. The European herb, *Potentilla Reptans*, possesses similar properties.

Off. Prep.—Decoctum Potentillæ.

POTENTILLA TORMENTILLA.

Tormentil.

Nat. Ord.—Rosaceæ. Sex. Syst.—Icosandria Polygynia.

THE ROOT.

Description.—Tormentil or *Septfoil*, is the *Tormentilla Erecta* of Willdenow, and the *Tormentilla Officinalis* of Smith. It has a perennial, tough, woody root or *rhizoma*, about the thickness and length of the upper joint of the fore-finger, with numerous radicles. The *stems* are slender, weak, erect, often procumbent, branching toward the top, and six or eight inches high. The *leaves* are almost sessile, and consist on the stalk of seven, on the branches of five palmate, elliptical, villous,

deeply serrated leaflets, three of which are larger than the others. The *flowers* are small, bright-yellow, with the parts of the calyx and corolla in fours, on slender axillary hairy stalks much longer than the leaves. *Carpels* corrugated when ripe.

History.—Tormentil or Septfoil is a plant common to Europe. All parts of it are astringent, but the root is the part usually employed. It is cylindrical or roundish, rather larger at its upper extremity, an inch or two in length, about as thick as the finger, knotty, sometimes contorted, brown or blackish externally, and reddish within. It has a slight aromatic odor, and a very astringent taste. It yields its virtues to boiling water. It contains an abundance of tannic acid, a red coloring principle soluble in alcohol, but insoluble in water, resin, cerin, myricin gummy-extractive, gum, lignin, extractive, water, and a trace of volatile oil. It is said to be used in some of the islands of Scotland for tanning leather, and in Lapland for staining leather red. It is equally applicable in medicine with catechu, kino, and other foreign astringents.

Properties and Uses.—A simple and powerful astringent; used in all cases of disease in which this class of medicines is indicated. It may be given in substance, decoction, or extract. Dose of the powder, from thirty to sixty grains.

Off. Prep.—Decoctum Tormentillæ.

PRINOS VERTICILLATUS.

Black Alder.

Nat. Ord.—Aquifoliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE BARK AND BERRIES.

Description.—This is an indigenous shrub of irregular growth, sometimes known as *Winterberry*, having a *stem* six or eight feet in height, with a bluish-gray, or ash-colored bark, and alternate, horizontal, and spreading *branches*. The *leaves* are alternate, or irregular, on short petioles, oval, acute at the base, pointed, sharply serrate, of an olive-green color, smooth above, and pubescent beneath, particularly on the veins. The *flowers* are small, white, dicæious, on very short peduncles; the fertile ones somewhat clustered or solitary; the sterile ones sub-umbellate; sometimes the flowers are monæcious. The *calyx* is small, six-cleft, persistent. *Corolla* monopetalous, spreading, without a tube, the border divided into six obtuse segments. The *stamens* are equal in number to the divisions of the corolla, erect, with oblong anthers; in the fertile flowers they are shorter than the corolla, in the sterile they are equal in length to it. The *ovary* is large, green, roundish, with a short style and obtuse stigma. The *fruit* consists of bright scarlet, globular berries, about the size of a pea, supported by the persistent

calyx, and crowned with the stigma, six-celled, containing six long seeds, which are convex outwardly, and sharp-edged within. Several of them are clustered together so as to form little apparently verticillate bunches at irregular intervals on the stem.

History.—Black Alder is found in nearly all parts of the United States, from Canada to Florida, in moist woods, swamps, borders of ponds, ditches, etc., flowering in July, and ripening its fruit late in autumn. The bark and berries are officinal. The dried bark is in slender pieces, more or less rolled, brittle, greenish-white internally, and covered with a smooth, whitish ash epidermis, alternating or mingled with brown, and easily separable. It has a bitter, slightly astringent taste, but no smell. Boiling water extracts its virtues. The berries are sometimes, but improperly, substituted for the bark, they have a sweetish, bitter, acrid taste, and impart their virtues to water or alcohol. These have not been analyzed.

Properties and Uses.—Black Alder is tonic, alterative, and astringent. It has been used with good effect in jaundice, diarrhea, intermittent fever, and other diseases connected with a debilitated state of the system, especially gangrene and mortification; it has also been of service in dropsy. Two drachms of the powdered bark and one drachm of powdered golden-seal, infused in a pint of boiling water, and when cold, taken in the course of the day, in doses of a wineglassful, and repeated daily, has proved very valuable in dyspepsia. Externally, the decoction forms an excellent local application in gangrene, to ill-conditioned ulcers, chronic cutaneous eruptions, etc. The berries are cathartic and vermifuge, and form, with cedar-apples, a pleasant and effectual worm medicine for children. (See *Juniperus Virginiana*.) Dose, of the powdered bark, from half a drachm to one drachm; of the decoction four fluidounces three or four times a day. Black Alder bark is an ingredient of several alterative syrups.

Off. Prep.—Decoctum Prinos.

PRUNUS VIRGINIANA.

Wild Cherry.

Nat. Ord.—Drupaceæ, *De Candolle*; Amygdaleæ, *Lindley*. *Sex. Syst.*—Icæandria Monogynia.

THE BARK.

Description.—This tree is the *Cerasus Serotina* of *De Candolle*, and the *Cerasus Virginiana* of *Michaux*; it is a large tree, and has been seen from eighty to one hundred feet high. Its usual size, however, is from fifty to eighty feet high, from two to four feet in diameter, being of uniform size and undivided to the height of twenty or thirty feet. The bark is black and rough, which spontaneously detaches itself semicircularly,

in thick narrow plates. The *wood* is compact, fine-grained, and receives a fine polish, and is extensively used by cabinet manufacturers. The *leaves* are deciduous, oval-oblong, or lanceolate-oblong, acuminate, unequally serrate, with incurved, short and callous teeth, thickish, smooth on both sides, except the midrib, shining above, of a beautiful brilliant green, from three to five inches long, and one-half as wide, and supported alternately on petioles, which are furnished with one or two pairs of reddish glands. The *flowers* are small, white, and disposed in elongate, spreading, and sometimes pendulous racemes. The *fruit* is a globular drupe about the size of a pea, of a purplish-black color, edible, but having a bitter taste.

History.—The Wild Cherry tree is found in many parts of the United States, but is most abundant, and attains the greatest magnitude, in the south-western States. Its flowers appear in May, and the fruit ripens in August and September. The officinal portion is the bark, and that of the root should be preferred to that of the trunk or branches. When dried and prepared for use, it is in pieces of various lengths and sizes, deprived of epidermis, of a reddish-brown color, bitter, and easily pulverized. Its powder is of a fawn color. When recent, or when boiled in water, it emits an odor resembling that of peach-leaves; and its taste is agreeably bitter and aromatic, with a flavor similar to that of peach-meats. It imparts its properties to alcohol or water, whether hot or cold; but boiling destroys its remedial qualities, partly in consequence of the escape of its volatile principle, and partly upon a chemical change effected by the heat. It should be employed in a recently dried state, as its properties are much impaired by keeping. Mr. S. Procter found it to contain starch, resin, tannin, gallic acid, fatty matter, lignin, red coloring matter, salts of lime and potassa, and iron, also a volatile oil associated with hydrocyanic acid, of a light-straw color, and analogous in its properties to the essential oil of bitter almonds. Two drops of it destroyed a cat in nearly five minutes. This volatile oil and the hydrocyanic acid do not exist ready formed in the bark, but are caused by the reaction of water upon *amygdalin*, which is one of the constituents of the bark; and which change is very probably effected by the agency of another principle, analogous to, if not identical with, *emulsin*, or the *synaptase* of Robiquet.

Properties and Uses.—Tonic and stimulant in its operation on the digestive organs, and at the same time exercising a sedative influence on the circulatory and nervous systems. It is, therefore, useful in all diseases where it is of importance to impart tonicity, and yet, to avoid any undue excitement of the heart and blood-vessels, as for instance, during the first stage of convalescence from inflammatory attacks, and in many pulmonary diseases. It is very generally used in phthisis, where hectic fever exists, and has also been used with benefit in some forms of

dyspepsia. In large doses it diminishes the action of the heart, owing probably to the hydrocyanic acid which it affords. It has likewise been of service in scrofula and other diseases attended with much debility and hectic fever. Externally it has been found useful in decoction as a wash to ill-conditioned ulcers. An excellent preparation is a syrup made by macerating four ounces of the powdered bark with twelve fluidounces of water, for two days; the mixture is then placed in a percolator or displacement apparatus, returning the liquid which passes till it comes away clear—displacing with an additional quantity of water, until twelve fluidounces of infusion are obtained, and then dissolving in this thirteen ounces of loaf sugar; the dose of this syrup is from half a fluidounce to one ounce. Dose of the powdered bark, one or two drachms; of the infusion, one ounce of bark to one pint of cold water, and allowed to stand a few hours, from one to four fluidounces, four or five times a day, and which is the best mode of using it.

The PRUNUS DOMESTICUS, or cultivated *Prune* or *Plum Tree*, may be referred to here. The dried or prepared fruit is the only officinal part, and furnishes the *prunes* of commerce. Those imported into this country, are principally from the south of France, the finest kinds coming from the port of Bordeaux. A poorer kind is brought from Germany. Prunes are prepared by exposing the fresh fruit to the heat of an oven, and then drying in the sun. They have a faint odor, a sweet, mucilaginous, somewhat acid taste, and contain crystallizable and uncrystallizable sugar, malic acid, and mucilaginous matter. In Germany a kind of brandy is obtained from this fruit, and which may be sometimes had of the importers of German liquors. Prunes are laxative and nutritious, and stewed with water form an excellent diet in cases of constipation, and also during convalescence from febrile or inflammatory diseases. They are often added to purgative decoctions, and the pulp is employed in the preparation of laxative confections. When taken too largely, and especially in those whose digestive organs are debilitated or impaired, they are apt to cause flatulence, and griping. The following preparation has been administered with much success in leucorrhea, irregular menstruation, and in debility from frequent abortions: Take of small raisins or dried currants two ounces, aniseed, mace, and cinnamon, of each, half an ounce, and one nutmeg in powder; to these add one quart of prune brandy, and let them macerate for two weeks, frequently agitating. This is the formula as originally given. Of the clear tincture thus made, one fluidounce may be given previous to a meal, and repeated three times daily.

Off. Prep.—Infusum Pruni Virginianæ; Tinctura Laricis Composita; Vinum Cinchonæ Compositum.

PTELEA TRIFOLIATA.

Shrubby Trefoil.

Nat. Ord.—Xanthoxylaceae. *Sex. Syst.*—Tetrandria Monogynia.

THE BARK OF THE ROOT.

Description.—This plant is also known by the names of *Wingseed*, *Wafer-Ash*, and *Swamp-Dogwood*. It is a shrub from six to eight feet in height, with the *leaves* trifoliate, and marked with pellucid dots; the *leaflets* are sessile, ovate, short acuminate, downy beneath when young, crenulate, or obscurely toothed; lateral ones inequilateral, terminal ones cuneate at base, from three to four and a half inches long by one inch and a quarter to one inch and three-quarters wide. The *flowers* are polygamous, greenish-white, nearly half an inch in diameter, of a disagreeable odor, and disposed in terminal corymbose cymes. *Stamens* mostly four; *style* short. *Fruit* a two-celled samara, nearly an inch in diameter, winged all round, nearly orbicular.

History.—Shrubby Trefoil or Ptelea, is a shrub common to this country, growing more abundantly west of the Alleghanies in shady moist hedges and edges of woods, and in rocky places; it flowers in June. The bark of the root is officinal, and yields its properties to boiling water; but alcohol is its best solvent. It is, when dried, of a light brownish-yellow color externally, in cylindrical rolls or quills, a line or two in thickness, and from one to several inches in length, irregularly wrinkled and furrowed externally, with broad, transverse lines or rings at short but irregular intervals, and is covered with a thin epidermis; internally it is yellowish-white, but becomes darker on exposure, and is wrinkled longitudinally; it is brittle with an almost smooth, resinous fracture, granular under the microscope, resembling wax. It has a peculiar smell, somewhat similar to that of liquorice-root, and a peculiar bitter, resinous, pungent, acrid, and rather disagreeable taste, speedily and powerfully acting upon the mouth and fauces, and the pungency of which is persistent, and which is probably owing to its oil. It has not been analyzed. The fruit is bitter and aromatic.

Properties and Uses.—Ptelea is tonic. Used in intermittent fevers, remittent fevers, and all cases of debility where tonics are indicated. Said also to be anthelmintic. Equal parts of Ptelea and the *Euonymus Atropurpureus*, have been highly recommended in pulmonary affections. A tincture of Ptelea, made in whisky, is reputed to have cured several cases of asthma, and it is said to cause, in many instances where it has been used, a troublesome external erysipelatous inflammation, either general or local, but which, if the use of the tincture be persisted in, finally disappears, and the patient becomes at the same time permanently cured of the disease for which he was treated. This would certainly indicate other valuable properties in this plant, than those with

which we are acquainted, and deserves a further and thorough investigation. It may be used in powder, tincture, or extract. Dose of the powder, ten to thirty grains, three or four times a day; of the tincture, one or two fluidrachms; of the extract, five to ten grains.

Off. Prep.—Extractum Pteleæ Hydro-alcoholicum; Infusum Pteleæ; Ptelein.

PTELEIN.

Ptelein.

THE OLEO-RESINOUS PRINCIPLE OF PTELEA TRIFOLIATA.

Preparation.—Make a saturated tincture of the bark of Ptelea Trifoliata, add to it twice its volume of water, and distil off the alcohol; the ptelein remains in the water, from which it must be separated.

History.—Ptelein, I believe, was first prepared by Mr. W. S. Merrell, and is obtained from the tincture of the bark by precipitation with water, in the same manner by which podophyllin, iridin, eupurpurin, etc., are obtained. It is of the consistence of thick syrup or molasses, dark-brown in mass, much lighter when in thin layers, and has a peculiar odor, somewhat similar to that of the extract of liquorice, and an oily, bitterish, acrid, persistent taste, peculiar and rather disagreeable, and acting powerfully on the fauces. It is soluble in alcohol, ether, oil of turpentine, and rather imperfectly in alkaline solutions; insoluble in acids and water. It imparts a slight milky color to water, and separates into two portions, one of which floats on the water, while the other sinks. Acetic acid added to its alcoholic or ethereal solution does not disturb them, unless added in excess. Water added to the alcoholic solution produces a milky color, precipitating the resin; added to the ethereal solution it separates the oil, which floats on the surface.

Properties and Uses.—Ptelein is a tonic, and possesses other properties not yet satisfactorily understood. It is a valuable medicinal agent, which should receive the especial attention of the profession. I have used it extensively and successfully in cases of dyspepsia, combined with equal parts of Xanthoxylin, and given in doses of one or two grains, repeated three times a day; if constipation be present, I have found the following an admirable combination: Take of ptelein nineteen grains, alcoholic extract of nux vomica one grain, white sugar, or lactin, two drachms. Mix thoroughly together; the dose is six grains to be repeated three or four times a day. I have found the following a valuable pill in chronic erysipelas, hepatic torpor, enlarged spleen, habitual constipation, chronic dysentery, and some forms of dyspepsia: Take of podophyllin and leptandrin, of each one grain, sulphate of quinia four grains, ptelein eight grains; mix these together, and divide into eight pills. The dose is one pill, to be repeated two or three times a day, and the alkaline bath to be used daily.

PTERIS ATROPURPUREA.

Rockbrake.

Nat. Ord.—Filices ; Polypodiaceæ, Brown. *Sex. Syst.*—Cryptogamia Filices.

THE PLANT.

Description.—Rock-brake is an indigenous perennial fern, with a *frond* from six to ten inches in high, twice as long as wide, of a grayish hue, pinnate, the two lower divisions consisting of from one to three pairs of leaflets with a large, terminal segment. The *stipe* and *rachis*, dark-purple, shining, with dense, paleaceous hairs at base. The *lower leaflets* ternate or pinnate, lanceolate, obtuse, distinct, obliquely truncate or subcordate at base, with margins conspicuously revolute. *Involucre* rather broad, formed of the inflected margin of the frond, and opening inwardly. *Sori* in a broad continuous line along the margin of the frond. The several varieties of this species possess similar properties, as the *Pteris Venosa*, with the *stipe* angled, and the *leaflets* veined beneath; *P. Punctata*, with the *stipe* terete, and the leaflets punctate beneath.

The *PTERIS AQUILINA* or *common Brake* likewise possesses analogous virtues. It is a fern from two to five feet in high, upon a smooth, dark-purple, erect *stipe*. The *frond* is pinnate, three-parted, broad-triangular in outline. The *branches* are bipinnate. The *leaflets* linear-lanceolate; the lower ones pinnatifid, the upper ones entire; *segments* oblong, obtuse. *Sori* covered by the folding back of the margins of the segments.

History.—Rock-brake is common to the United States, usually growing on limestone rocks; the common Brake is found in greater abundance, in woods, pastures, waste grounds, and stony hills. The whole plant is used in medicine, and imparts its virtues to water. No analysis has been made of it. As found in the shops, the dried root consists of a long cylindrical caudex, of a dark-brown color externally, and light brownish-red internally, of an astringent, leathery taste and around which are closely arranged, overlapping each other like the shingles of a roof, the remains of the leafstalks or stipes, which are an inch or two in length, from two to four lines thick, somewhat curved and directed upward, angular, dark-brown, furrowed longitudinally, and from between which, emerge numerous small radical fibers. The dried leaves are of a light-grayish or greenish-yellow color, of an odor resembling that of sole leather, and a leathery, astringent, not disagreeable taste. As sold, it is usually in broken fragments.

Properties and Uses.—Rock-brake is astringent and anthelmintic. A decoction of it, taken moderately, has proved efficacious in diarrhea, dysentery, night-sweats, and hemorrhages; and used as a local application, it is beneficial in obstinate and ill-conditioned ulcers, ulcerations of the mouth and fauces, and, as a vaginal injection in leucorrhea. A

strong decoction is in some repute as a remedy for worms. A powerful astringent infusion may be made by adding four drachms of the plant to one pint of boiling water, and which has been used in diarrhea and dysentery, in half fluidounce doses repeated every two or three hours, with success.

A plant called *Winter-fern* or *Brake* is much employed in amenorrhea, and in suppression of the lochia; it is used in infusion, and taken freely. By some it is supposed to be the *Pteris Atropurpurea*; but of this I am not positive, not having been able to obtain a perfect specimen of the plant for examination. Both the roots and tops are used, and are worthy the attention of the practitioner in the above-named derangements.

PTEROCARPUS SANTALINUS.

Red Saunders.

Nat. Ord.—Fabaceæ, or Leguminosæ. *Sex. Syst.*—Diadelphia Decandria.

THE WOOD.

Description.—This is a large tree with alternate branches. The *leaves* are petiolate, ternate, and alternate; the *leaflets* are alternate, petiolate, the uppermost larger, ovate-roundish or oblong, entire, emarginate or retuse, veined, smooth above, and hoary beneath. The *flowers* are yellow, in axillary, erect, simple or branched racemes; the *corolla* is papilionaceous, the *vexillum* or *banner* of which is obcordate, erect, somewhat reflexed at the sides, toothed and waved, having red veins; the *alæ* or *wings* spreading, with their edges apparently toothed, and the *carina* or *keel* oblong, short, and inflated. The *calyx* is brown. *Filaments* ten, diadelphous. *Legume* roundish, stalked, falcate upward, compressed, smooth, keeled on the lower edge, the *keel* being membranous and undulated. *Seeds* solitary.

History.—This is a large forest tree inhabiting Ceylon, and the mountains of the opposite Coromandel coast on the Indian continent. The wood is the officinal *Red Saunders* or *Red Sandal wood*. It is imported in billets which are dense, heavy, dark-brown externally, and internally dark-red with light-red rings. It is usually kept in the shops in the state of small chips, raspings, or coarse powder. It has a faint, peculiar odor, and an obscurely astringent taste, and is of difficult pulverization. It may be distinguished from other coloring woods, by imparting a red color to alcohol, ether, and alkaline solutions, but not to water. The alcoholic tincture causes a deep violet precipitate with the sulphate of iron, a scarlet with the bichloride of mercury, and a violet with the soluble salts of lead. About seventeen per cent. of a yellow resinoid, coloring principle was obtained from it by Pelletier, which became red from the action of the air; he named it *Santalin* $C_{16}H_{16}O_3$. It may be obtained either by precipitation of the tincture with water, or by

preparing an infusion with an alkaline solution, and precipitating with an acid. It is insoluble in water, soluble in alcohol or ether, slightly soluble in volatile oils, with the exception of those of lavender and rosemary, which readily dissolve it. Soluble in acetic acid, and readily soluble without decomposition in alkalis; the acetic solution is somewhat astringent to the taste, and is precipitated by solution of gelatin. It is said to be possessed of acid properties.

Properties and Uses.—Tonic and astringent; formerly used for these indications, but at present employed only for coloring tinctures, etc.

PTEROSPORA ANDROMEDA.

Crawley.

Nat. Ord.—Ericaceæ; *Suborder*, Monotropeæ. *Sex. Syst.*—Decandria Monogynia.

THE ROOT.

Description.—This plant, also known by the various names of *Dragon's Claw*, *Pine-drops*, *Albany Beech-drops*, *Fever-root*, etc., has a perennial, fleshy, tuberculous root, with many *tubers* which resemble the claws of a fowl. The *stem* or *scape* is erect, simple, straight, dark-purple, cylindrical, covered with short viscid wool, from eight to thirty inches in height, leafless, and sparsely beset with scales. *Leaves* none. The *flowers* are pale or reddish-white, lateral, nodding, and disposed in a terminal raceme from six to twelve inches long, and composed of fifty or more flowers; the *pedicels* are irregularly scattered, from six to eight lines in length, and axillary to long, linear bracts. The *calyx* is five-parted; the *corolla* is roundish-ovoid, urn-shaped, the limb five-toothed, reflexed, and inclosing the stamens. *Stamens* ten; *filaments* flat; *anthers* peltate, two-celled, two-awned, opening lengthwise; *style* short; *stigma* five-lobed, capitate. *Capsule* or *pod* globose, depressed, five-lobed, five-celled, loculicidal. *Seeds* very numerous, minute, ovoid, tapering to each end, the apex expanded into a broad reticulated wing many times larger than the nucleus.

History.—This is a rare and singular plant, found on barren hills and shady uplands, and in hard clay soil, in the State of New York and some other of the northern States and Canada, flowering in July. By some it is supposed to be parasitic on the roots of certain trees. It was first discovered in 1816 by Dr. D. S. C. H. Smith, although long known previous to that time by herbalists. The entire plant is destitute of verdure. The root is the officinal part, it is small, dark-brown, resembling cloves or a hen's claw, has a strong, nitrous smell, and a mucilaginous, slightly-bitter, astringent taste. It has not been analyzed, hence its proper menstrua are unknown.—There are four varieties, the *P. Pauciflora*, or Few-flowered Crawley; the *P. Leucorhiza*, or White-stalked

Crawley; the *P. Flaviculis*, or Yellow-stalked Crawley; and the *P. Elatior*, or High-stalked Crawley—all of which possess similar medicinal virtues. The first two are found in the Western States.

Properties and Uses.—Crawley is, probably, the most powerful, prompt, and certain diaphoretic, in the *Materia Medica*, but its scarcity and high price prevent it from coming into general use. It is also sedative, and promotes perspiration, without producing any excitement in the system. Its chief value is as a diaphoretic in fevers, especially typhus, and in inflammatory diseases; it has proved efficacious in acute erysipelas, cramps, flatulency, pleurisy and night-sweats; and relieves hectic fever without debilitating the patient. Probably it will be found to combine tonic, sedative, diaphoretic, and febrifuge properties. Its virtues are especially marked in the low stage of fevers. The dose is from twenty to thirty grains of the powdered root, given in water as warm as the patient can drink, and repeated every hour or two, according to circumstances. The powder should always be kept in well-closed vials; it constitutes the “fever powders” of some practitioners. Combined with caulophyllin it forms an excellent agent in amenorrhea and dysmenorrhea; and is unsurpassed in after-pains, suppression of lochia, and the febrile symptoms which sometimes occur at the parturient period. In fevers it may be advantageously combined with leptandrin, or podophyllin, where it is found necessary to act upon the bowels or liver; and mixed with dioscorein, it will be found almost a specific in flatulent and bilious colic. It has not been recognized in the standard works on *Materia Medica*, but deserves more attention than has been bestowed upon it.

PULMONARIA OFFICINALIS.

Lungwort.

Nat. Ord.—Boraginaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES.

Description.—This is a rough plant, with a stem about one foot in height. The radical leaves are ovate, cordate, scabrous, and the cauline ones ovate and sessile. The flowers are blue, and in terminal clusters. The calyx is prismatic, five-angled, five-toothed, and as long as the tube of the corolla; the corolla is infundibuliform, with a cylindric tube, orifice hairy in five lines alternating with the stamens; stigma emarginate; achenia roundish, obtuse, imperforate at base.

History.—This is a herbaceous perennial, growing in Europe and this country, in northern latitudes. In Europe it is a rough-leaved plant, but in this country the whole plant is smooth. The *Mertensia Virginica*, or *Virginian Lungwort*, or *Cowslip*, is frequently employed in the United States; it is the *Pulmonaria Virginica* of Linnæus, and the *Lithospermum Pulchrum*.

of Lehman. It is a smooth, erect and elegant plant, about twenty inches in height, the *radical leaves* of which are obtuse, obovate-elliptical, and become from five to six inches long, and about two-thirds as wide, many-veined, and the *cauline* are long-lanceolate and sessile. The *flowers* are blue, and in terminal clusters. The *calyx* five-cleft, much shorter than the tube of the corolla, limb longer than the tube; the corolla is nearly an inch long, funnel-form, four times the length of the calyx, naked in the throat, and the much-spreading border slightly five-lobed, *stamens* and *style* included; *filaments* slender. *Disk* bearing two glands as long as the ovaries. The stem and leaves are usually pellucid-punctate. This plant is found in alluvial banks, growing from western New York to Georgia and the Western States, and flowering in May. Being a showy plant it is frequently cultivated.—The leaves of these plants are the parts used; they are inodorous, and have a herbaceous, somewhat mucilaginous, and feebly astringent taste. Water extracts their properties.

Properties and Uses.—Demulcent and mucilaginous, and may be used in decoction, whenever this class of agents is indicated. They have been much used in catarrh, hemoptysis, and other diseases of the respiratory organs.

PUNICA GRANATUM.

Pomegranate.

Nat. Ord.—Myrtaceæ. *Sex. Syst.*—Icosandria Monogynia.

THE RIND OF THE FRUIT AND BARK OF THE ROOT.

Description.—The Pomegranate is a beautiful shrub, covered with a brownish bark, with many slender branches, which are more or less spiny. In favorable situations it frequently attains the height of twenty feet. The *leaves* are opposite or ternate, sessile, smooth, waved, entire, oblong, inclining to lanceolate, of a bright-green color, two or three inches long, by from five to ten lines wide, and without a marginal vein. The *flowers* are large, of a rich scarlet color, solitary, or two or three together, terminal. The *calyx* is turbinate, thick, fleshy, red, and divided into five acute segments, which are valvate in æstivation. The *corolla* consists of five large, wrinkled, membranous petals, somewhat spreading, and which are inserted into the upper part of the tube of the calyx. The *stamens* are indefinite, with capillary *filaments*, and oblong, two-celled *anthers*, bursting in front by two chinks. The *ovary* is inferior, with a simple *style*, crowned by a papulose *stigma*. The *fruit* is the size of an orange, globular, somewhat compressed, and indehiscent; it is filled with numerous, angular, exalbuminous seeds, each enveloped in a juicy rose-colored pulp, and is crowned with the limb of the calyx, and covered with a thick, tawny, coriaceous rind, which is the dilated calycine tube. This *balauſt*, as it is termed, is divided into two chambers.

by a transverse diaphragm. The upper chamber is five to nine-celled, and the lower three-celled. The placentæ of the upper division extend from the parietes to the center, while those of the lower proceed irregularly from the bottom.

History.—The Pomegranate is a native of Northern Africa, Syria, Persia, China, and other countries of Asia, and has been naturalized in the West Indies, and other civilized countries in warm latitudes. It has splendid, dark-scarlet flowers, often doubled, which appear in July and August. The *flowers* have a bitterish, astringent taste, without odor, and their infusion gives a deep bluish-black precipitate with the salts of the sesquioxide of iron; the saliva is colored a violet-red upon chewing them. They contain tannic and gallic acids, and together with the seeds are recognized as officinal in some foreign Pharmacopœias. The *fruit* varies in size and flavor, that of the West Indies becoming the most perfect; it contains a red, succulent, pleasantly acid, sweetish, and edible pulp. The *rind of the fruit*, and the *bark of the root*, are the only parts employed in this country.

The *Rind of the fruit*, (*Granatum*, London; *Punicæ Granati Cortex*, Dublin, or *Granati Fructus Cortex*, United States,) when dry, is yellowish or reddish-brown externally, yellow within, about a line in thickness, smooth or finely tuberculated, hard, dry, brittle, in irregular fragments, inodorous, and of a very astringent, slightly bitter taste. Its infusion gives an abundant, dark-bluish precipitate with the salts of iron. It contains 18.8 per cent. of tannin, 17.1 of mucilage, 10.8 extractive matter, 30 lignin, a trace of resin, and 29.9 moisture.

The *root* is large, ligneous, knotty, and hard, and covered with a yellowish-gray, or ash-gray bark, which is yellow on its inner surface. The *Bark of the root*, (*Granati Radicis Cortex*), as found in commerce, is generally in quills, or fragments of quills, from two to six inches in length, and from half an inch to an inch in breadth, and nearly a line in thickness; it is grayish-yellow externally, with green specks, yellow internally, brittle, and not stringy. It breaks with a short fracture, has a faint, peculiar odor, has an astringent, bitter taste when fresh, the bitterness of which is nearly lost by drying. When chewed, it tinges the saliva yellow. Its infusion yields a deep-blue precipitate with the salts of iron, a yellowish white one with a solution of gelatin, a grayish-yellow with corrosive sublimate, and potassa or ammonia colors it purple. The inner surface of the bark, steeped in water and then rubbed on paper, stains it yellow, which becomes blue by the contact of sulphate of iron, and a slight rose tint by that of nitric acid, which soon vanishes. These properties will distinguish it from the barks of the box root and barberry branches, with which it is sometimes adulterated; the box bark is nearly white, bitter, not astringent, and its infusion is not precipitated by salts of iron. The barberry bark, very much resembles the

pomegranate, and is very bitter and not astringent, and is not affected by the salts of iron, solution of isinglass, corrosive sublimate, or potassa. The ligneous portion of pomegranate root is inert, and should, therefore, be always separated from the bark.

Pomegranate bark has been analyzed by several chemists, and contains fatty matter, tannic and gallic acids, starch, gum, resin, wax, chlorophylle, a saccharine substance having the properties of mannite, and some insoluble matters. Righini obtained a peculiar oleo-resinous principle from it, which he considers to be the source of its activity and which he named *Punicin*; it has an acrid taste, and affects the nostrils somewhat similar to veratria. It may be prepared by rubbing a hydro-alcoholic extract of the bark with one eighth of hydrate of potassa, heating the mixture with eight parts of pure water gradually added, then dropping in dilute sulphuric acid to neutralize the alkaline solution, and washing on a filter with cold water; the *punicin* separates and is obtained in the filter.

Properties and Uses.—The flowers and rind of the fruit are astringent, and have been used for arresting chronic mucous discharges, passive hemorrhages, aphthous disorders of the mouth, night-sweats, colliquative diarrhea, etc., but are now seldom employed. The rind has also been found serviceable in intermittent fever, and tapeworm. The bark of the root possesses anthelmintic properties, and is chiefly serviceable in tapeworm. The bark of the wild pomegranate is considered by the French to be more active than the cultivated plant. It may be given in powder, but the decoction is generally preferred. Two ounces of the bark are to be steeped in two pints of water, for twelve hours, then boil the whole down to one pint, strain, and give a wine-glassful every two hours, until the whole is taken. It commonly occasions several stools, an increased flow of urine, or nausea and vomiting, owing, it is supposed, to the agitation into which the worm is thrown from its presence. Sometimes joints of the worm begin to come away in less than an hour after the last dose. But often the doses must be repeated several successive mornings before they take effect, and it is right to repeat them occasionally for four or five days after the joints have ceased to come away. Laxatives should be administered from time to time. It is said to act with the greatest certainty when the joints of the worm come away naturally. The dose of the rind or flowers in powder, is from one to two scruples, and in decoction from one to three fluidounces. The seeds are demulcent.

Off. Prep.—Decoctum Granati Radicis.

PYCNANTHEMUM PILOSUM.

Pycnanthemum.

Nat. Ord.—Lamiaceæ, or Labiataë. *Ser. Syst.*—Didynamia Monogynia.

THE PLANT.

Description.—This is an indigenous perennial plant, with long and soft whitish hairs, and a subsimple *stem*, growing from one to two feet in height. The *leaves* are sessile, nearly entire, lanceolate, acute at both ends, and pilose beneath; the floral ones not whitened. The *flowers* are white, and disposed in large, terminal, sessile heads. The *calyx-teeth* are ovate-lanceolate, acute, and with the lanceolate *bracts*, are canescently villous and awnless. The *corolla* is pubescent, and the stamens exerted.

History.—This plant is found in low grounds, dry hills and plains, from Ohio and Illinois extending southward, and flowering in July and August. The whole plant is used and yields its virtues to boiling water; it has the taste and odor peculiar to the Mint family. There are several species of this genus which possess similar medicinal properties, as the *Pycnanthemum Virginicum*, Narrow-leaf Virginian Thyme or Prairie-Hyssop, a pubescent plant with white *flowers*, sessile, lance-linear, entire, and punctate *leaves*, terminal and corymbed heads, and acuminate *bracts*. Also the *P. Aristatum*, or *Wild Basil*, with lance-ovate, subserrate, pubescent, acuminate, and short petiolate *leaves*; with hirsute, terminal, capitate and subterminal *verticils*; *bracts* lance-subulate, and with the calyx terminated by awns. Likewise *P. Incanum*, and others.

Properties and Uses.—*Pycnanthemum* is diaphoretic, stimulant, anti-spasmodic; carminative, and tonic. A warm infusion is very useful in puerperal, remittent, and other forms of fever, coughs, colds, catarrhs, etc., and is of much benefit in spasmodic diseases, especially colic, cramp of the stomach, and spasms of infants. The cold infusion is a good tonic and stimulant during convalescence from exhausting diseases. Dose of the infusion, either warm or cold, from one to four fluidounces, three or more times a day.

Off. Prep.—Infusum *Pycnanthemi*.

PYRETHRUM PARTHENIUM.

Feverfew.

Nat. Ord.—Asteraceæ. *Ser. Syst.*—Syngenesia Superflua.

THE HERB.

Description.—Feverfew is a perennial, herbaceous plant, with a tapering *root*, and an erect, branched, leafy, round, furrowed *stem*, about two feet high. The *leaves* are alternate, petiolate, flat, bipinnate or tripinnate, of a hoary green, with the *segments* or *leaflets*

inclining to ovate, decurrent, gashed and dentate. The *flowers* are white and compound. The *panicle* corymbose, sometimes compound; the *peduncles* long, naked, single-flowered, swelling upward. *Flower-heads* erect, about half an inch broad, with a convex yellow disk, and numerous short, broad, abrupt, two-ribbed, white rays; often wanting; sometimes multiplied, and the disk being obliterated, constitutes a double flower. *Involucre* hemispherical, imbricate, pubescent, with the scales scarious at the edge; *receptacle* flat or convex, naked; *achenia* wingless, angular, uniform, crowned by a coroneted *pappus* which is usually toothed, and occasionally auriculate.

History.—This is a European plant, and is common to the United States, found occasionally in a wild state, but is generally cultivated in gardens, and flowers in June and July. It is the *Matricaria Parthenium* of Linnæus, and the *Chrysanthemum Parthenium* of Persoon. It imparts its virtues to water, but much better to alcohol.

Properties and Uses.—Tonic, carminative, emmenagogue, vermifuge, and stimulant. The warm infusion is an excellent remedy in recent colds, flatulency, worms, irregular menstruation, hysteria, suppression of the urine, and in some febrile diseases. In hysteria, or flatulency, one teaspoonful of the compound spirits of lavender forms a valuable addition to the dose of the infusion, which is from two to four fluid-ounces. The cold infusion or extract, makes a valuable tonic. The leaves in poultice are an excellent local application in severe pain or swelling of the bowels, etc.

Off. Prep.—Infusum Pyrethri.

PYROLA ROTUNDIFOLIA.

Round-leaved Pyrola.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE HERB.

Description.—This is a perennial, low, scarcely suffruticose, evergreen herb, known by the various names of *False Wintergreen*, *Shin-leaf*, *Canker-Lettuce*, *Pear-leaf Wintergreen*, etc. The *leaves* are radical or nearly so, orbicular-ovate, nearly two inches in diameter, smooth, shining, thick, entire or crenulate, usually shorter than the petiole, with conspicuous, reticulate veins. The *petioles* are margined, as long as, and usually much longer than the leaf. The *scape* is mostly racemose, three-angled, from six to twelve inches high, with scaly bracts at base and in the middle. The *flowers* are many, large, fragrant, white, drooping, about three-fourths of an inch broad, and disposed in an oblong, terminal raceme. The *calyx* is five-parted, persistent; the *lobes* lanceolate, acute, with somewhat spreading tips, one-half or one-third the length of

the petals. *Petals* five, roundish-obovate, nearly spreading, concave deciduous. *Stamens* ten, ascending; *filaments* awl-shaped, naked. *anthers* large, pendulous; *stigmas* exerted beyond the ring; *style* declining and curved, longer than the petals. *Capsule* five-celled, five-valved, opening at the angles, many-seeded.

History.—This plant is common in damp and shady woods, throughout various parts of the United States, bearing numerous white flowers in June and July. The whole plant is used, and imparts its medical properties to water. It has not been analyzed.

Properties and Uses.—Round-leaved Pyrola is tonic, astringent, diuretic, and antispasmodic. Used in decoction, both internally and externally in various cutaneous eruptions, likewise in a carcinomatous or scrofulous taint of the system, and in leucorrhea, and some uterine diseases. As a local application it will be found of service in sore-throat, and ulcerations of the mouth, indolent ulcers, ophthalmia, etc., and forms an excellent soothing poultice for boils, carbuncles, and all painful tumors or swellings. The decoction, taken internally, is said to be valuable in many urinary affections, as gravel, hematuria, and ulceration of the bladder, and in some nervous diseases. The decoction and extract have been used with success in convulsions, and form a large portion of a popular nostrum for epilepsy. Dose of the decoction, one or two fluid-ounces, three or four times a day; of the extract, from two to five grains.

Off. Prep.—Decoctum Pyrolæ Rotundifoliæ.

PYRUS MALUS.

The Apple-tree.

Nat. Ord.—Rosaceæ; *Suborder*, Pomeæ. *Sex. Syst.*—Icosandria Pentagynia.

THE BARK.

Description.—This is a well known tree, growing from twenty to forty feet high, with rigid, crooked, spreading branches, and a rough, blackish bark. The leaves are from two to three inches long, and about two-thirds as wide, ovate, or oblong-ovate, serrate, acute, or short-acuminate, pubescent above, tomentose beneath, and on petioles from half an inch to an inch in length. The flowers are large, fragrant, expanding with the leaves, pale-rose color, and arranged in subumbellate corymbs. The calyx-tube is urn-shaped, limb five-cleft; pedicels and calyx villous-tomentose. Petals five, roundish, or obovate, with short claws. Stamens numerous; styles five, united and villose at base. Fruit or pome globose.

History.—The Apple Tree is a native of Europe, naturalized in this country, and flowers from April to June. There are, probably, nearly

Apple Tree

one thousand varieties cultivated in the United States, and all of which are said to be derived from the *Wild Crab*. From the fruit, cider is manufactured, and both the fruit and its cider are much used for domestic and medicinal purposes. The bark is bitter and has been employed in medicine, it contains a principle called *Phloridzin*; the root-bark is the most active, and yields its virtues to boiling water.

Phloridzin was discovered by Dr. Konink, a German physician, who found it to exist in the bark of the apple, pear, cherry, and plum trees, but in greater abundance in the fresh root-bark. To obtain it, the bark of the recent roots is boiled with water sufficient to cover them, for about an hour; the fluid is poured off, and as much more poured in for a second boiling. The decoctions are placed in a clean vessel, and set aside to remain undisturbed for about twenty-four hours, at the end of which time will be found a copious precipitate of phloridzin, of a deep-red, velvety-looking color. To remove the color, and render the article white, it is to be boiled with distilled water and animal charcoal, and then filtered; this process is to be repeated two or three times, and then by allowing the solution to cool slowly, the phloridzin is deposited in the crystalline state. By evaporating the decoction, (after the above precipitate has been collected,) to about one-fifth of its bulk, an additional quantity of phloridzin may be obtained, on allowing it to cool. It is light, white, crystallizable in silky needles, of a bitter taste, soluble in alcohol and boiling water, scarcely soluble in cold water or ether, and dissolved without change by alkaline solutions, and especially by ammonia; heated to 212° it is deprived of its water of crystallization, and at a higher temperature it is fusible. It is without acid or alkaline reaction, and consists of carbon, hydrogen and oxygen.

Properties and Uses.—Apple Tree Bark is tonic and febrifuge, and a decoction of it has been used with advantage in intermittent, remittent, and bilious fevers, and in convalescence from exhausting diseases. It may be given in doses of from one to four fluidounces, three times a day. A strong decoction or syrup of the Sweet-apple tree bark has been employed with success in some cases of gravel. The fruit or apple contains both malic and acetic acids, has a pleasant and refreshing flavor, and is a useful and healthy article of diet. However, it should not be eaten by dyspeptics, or patients afflicted with gout, rheumatism, or renal and cutaneous diseases. When baked, stewed, or roasted, it becomes valuable as an agreeable and healthy diet in febrile diseases, exanthema, etc., and is more easily digested than when raw; it also becomes slightly laxative and is beneficial in cases of habitual constipation. Raw apples should always be well masticated before being swallowed, as otherwise, they may become a source of serious difficulties, especially with children. An apple tea may be made for fever patients, by boiling a tart apple in half a pint of water, and sweetening with sugar.

La Maza Garraw Cortez

The last of the
Small hands of the

make up the loss from the
A fine of £50 was imposed yesterday
Messrs Osbeck and Co., Newcastle,
offering to sell at prices exceeding
the maximum, and the Motor Cattery
Co. were fined £50 for offering to buy.
A strange charity concert was held at
Grimby Dock, yesterday, at which the
artists performed upon a stage of fish
boxes erected upon a fish quay. The con-
cert had been arranged by the Mica Club
to aid St. Dunstan's Hostel, and within a
very short time over £2,000 was subscribed.
A bunch of chrysanthemums sold and re-
sold at auction realised £450.

German statesmen have not yet declared
that their arms rushed to Belgium's
assistance in August, 1914, knowing that
the British intention was to invade that
country, but such a statement is now
momentarily expected.—"The
Show." Confession
Sir Alfred Mond has gratefully accepted
Stowhenge from Mr Chubb on behalf of
the nation. It is to be hoped that the First
Commissioner will resist the temptation of
reeling over this ancient monument and
adapting it to the uses of some new
Ministry.—"The Passing Show."

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you, and send their best congratulations.—
 W. Batehead, Capt. 64th T.M.B.
 Before joining up, Pte. J. Jenkins was
 employed at the Dean and Chapter Colliery,
 and resides at 96, Durham Road, Spenny-
 moor.

AUCKLAND WAR HONOURS FUND

Mr. W. D. Dent, treasurer, has received
 £2 2s from Mr. Matthew Watkinson,
 Victoria-street, Bishop Auckland, towards
 the local War Honours Fund, and acknow-
 ledges same with best thanks. Further
 contributions towards this fund are
 urgently needed and will be gratefully
 acknowledged.

WEDDING

The wedding took place quietly in Trinity
 Presbyterian Church, Bishop Auckland, on
 Wednesday, of Miss Mabel Walton (younger
 daughter of Mr and Mrs J. G. Walton,
 Stanley House, Bishop Auckland) and Lieut.
 J. Bremner of the 9th Royal Scots and
 Royal Air Force, eldest son of Capt. and
 Mrs Bremner, Walsley, Cheshire.
 The bride, who was given away by her
 father, was accompanied by Miss Mattie
 Manners as bridesmaid, and the bridegroom
 was supported by Captain C. W. Eiken as
 officiating clergyman.

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The small branches and twigs of oak cultivated in France
Guercus Cortex yield the greatest amount of potash
in Spain Consumption to the Pharmacopoeia
 30%.

QUERCUS ALBA.

789

Cider forms not only a refreshing and agreeable drink for patients with fever, but actually exerts a salutary medicinal influence, especially where the tongue is coated brown or black. This is an American Eclectic agent which has recently been adopted by other writers in this class of diseases, and while we are gratified to observe the adoption of our remedies, we think that those who adopt our scientific improvements should regard the principles of courtesy and justice. It is well known that cider, in which horseradish, &c., has been steeped, has long been an Eclectic agent in the treatment of dropsy,—at this day its value is more generally recognized, as may be seen in "Wood's Practice," under the treatment of dropsy. We regret that in this instance, as heretofore, the American Eclectic remedy was adopted without giving due credit. Cooked apples form an excellent local application in ophthalmic inflammation, erysipelatous inflammation, sore and swelled throat in scarlatina, ulcers, etc.

Phloridzin is tonic and febrifuge, and in the dose of from ten to fifteen grains has cured intermittent fever where quinia has failed; unlike quinia it does not induce gastralgia.

Factor of base
 QUERCUS ALBA.
 White Oak.

Nat. Ord.—Corylaceæ, Lindley; Amentaceæ, Jussieu; Cupuliferae, Richard.
 Sex. Syst.—Monœcia Polyandria.

THE BARK.

Description.—Quercus Alba is a forest tree, varying in size according to the climate and soil, attaining the height of from sixty to ninety feet, with a diameter of from three to six feet. Its trunk and large branches are covered with a whitish bark, which serves to distinguish it from most of the other species. The leaves are oblong, pinnatifid, sinuate, smooth, bright-green above, pale or glaucous beneath, and regularly and obliquely divided into from three to five lobes, which are oblong, or linear, obtuse, mostly entire, and sometimes narrowed at their base. The flowers are monœcious and amentaceous. The cup is hemispherical, naked, much shorter than the acorn, deep, tuberculate. The acorns are large, ovate, coriaceous, one-celled, one-seeded, surrounded at base by the cup, and supported singly or in pairs upon peduncles nearly an inch in length.

QUERCUS RUBRA, or Red Oak, is a lofty, wide-spreading tree, attaining the height of about seventy feet, with a diameter of three or four feet. The leaves are from six to ten inches in length, on long petioles, oblong, smooth on both sides, pale beneath, obtusely sinuate, with short, and entire or sparingly dentate, mucronate lobes, from four to six on each side. The fructification is biennial. The acorns are oblong-ovoid, about an inch long, surrounded at base by a saucer-shaped, shallow, even cup, very much shorter than the acorn, of very small and close scales, and sessile.

Beech
See No 850
Fructus Quercus

QUERCUS TINCTORIA, *Quercitron* or *Black Oak*, is one of the loftiest trees in the forest, frequently attaining the height of from eighty to one hundred feet, with a diameter of four or five feet. The *bark* is deeply furrowed, black or deep-brown. The *leaves* are from six to eight inches long, obovate, oblong, more or less rusty-pubescent beneath, finally glabrous, slightly or sometimes deeply sinuate-lobed, with oblong, obtuse, mucronate, somewhat toothed *lobes*. The *acorns* are brown, nearly spherical or depressed-globose, about one-half immersed in a deep, thick, flat, conspicuously scaly *cup*, which is sessile. The leaves turn dark-red after frost.

History.—*Quercus* is a very large and important genus, consisting of many species, a large proportion of which grow in the United States. Their general character is that of astringents, and the three above described, are those which have been more particularly employed in medicine. The bark of the trees is the officinal portion.

White Oak grows throughout the Union, but is more abundant in the Middle States. Its wood is strong and durable, and is extensively employed in ship-building, coopering, carriage-making, etc. The bark is sometimes employed for tanning, but for this purpose, that of the *Red* and *Spanish Oaks* are preferred; its principal use is in medicine. It should be deprived of its epidermis, which contains no astringent property; it then presents a coarse fibrous texture, is tough and not easily pulverized, of a light yellowish-brown color, a feeble odor, and a strongly astringent, bitterish taste. Its active properties are extracted by water or alcohol. It contains a large proportion of tannin, some gallic acid, and extractive matter. The inner bark, collected during the spring, is said to afford the most tannin.

A bitter principle has been obtained from the European oak-bark (*Quercus Pedunculata*), called *Quercin*. Our own oak-bark is fully equal in medicinal virtues to the foreign, and may, undoubtedly, be substituted for this in obtaining quercin. The bark must be boiled with water acidulated with one-hundredth of sulphuric acid, after which the sulphuric acid is to be removed by the addition of sufficient milk of lime, and then a solution of carbonate of potassa must be added so long as it causes a white precipitate; filter the liquor, evaporate to the consistence of a thin extract, add alcohol, and finally evaporate the spirituous solution down to a small volume, and let it stand for some days; yellow crystals will form, which may be obtained colorless by repeated crystallizations. Thus prepared, quercin is in small white crystals, inodorous, very bitter, soluble in water, less so in alcohol containing water, insoluble in absolute alcohol, ether, or oil of turpentine, and is neutral.

Black Oak is likewise a forest tree common to the United States, the bark of which is much used in tanning, and for dyeing. It is more bitter than the other species named, and when chewed stains the saliva yellow. It is seldom employed internally on account of its disposition

Isotank of tannic acid
Cashin.

to irritate the bowels, but is valuable as an external astringent. Boiling water extracts a coloring principle from its cellular integument, of a brownish-yellow color, which is deepened by alkalies and rendered brighter by acids. This bark, deprived of its epidermis and powdered, is exported to Europe under the name of *Quercitron*, where it is extensively used for dyeing silk and wool of a yellow color. The coloring principle, called *Quercitrin* or *Quercitric Acid*, may be obtained by adding gelatin to a decoction of the bark, which precipitates the tannic acid, filtering the liquor, adding a very small quantity of hydrated oxide of lead, which produces a brown precipitate, pouring off the golden-yellow liquid left, precipitating again with an additional quantity of the hydrate, and decomposing the resulting quercitrate of lead by hydrosulphuric acid. Filter the colorless liquid left, evaporate in vacuo, and white needle-shaped crystals of pure quercitrin will be obtained, which has the property of combining with salifiable bases. Black oak bark contains more tannic and gallic acids than the other officinal species.

Red Oak is more common in the Northern States and Canada; its wood is reddish and coarse-grained, and used principally for fuel; its bark is extensively used in tanning. It contains considerable tannin, and is generally employed as an external agent. An extract of the bark, as well as the potash obtained from its ashes, are both much employed as a local application in the treatment of cancer, indolent ulcers, etc.

Properties and Uses.—Oak bark is somewhat tonic, powerfully astringent, and antiseptic. Used with advantage in intermittent fever, obstinate chronic diarrhea, chronic mucous discharges, and in certain forms of passive hemorrhages; likewise in phthisis, and diseases attended with great prostration, colliquative sweats, etc. In such cases, a decoction of it may be combined with lime-water. Externally, a decoction forms an excellent gargle for relaxed uvula and sore-throat, a good stimulating astringent lotion for ulcers with spongy granulations, and an astringent injection for leucorrhea, prolapsus ani, hemorrhoids, etc. A poultice of the ground bark has often proved of service in gangrene and mortification. In sickly, debilitated children, and in severe diarrheas, especially when the result of fevers, the decoction given internally, and used as a bath to the body and limbs, two or three times a day, will be found very efficacious. When given for diarrhœa or dysentery, it should be combined with aromatics, and sometimes with castor oil. A bath is often advantageous in some cutaneous diseases. The green bark of elder and white oak, bruised together, or in strong decoction, forms a very useful and valuable application to abrasions. Dose of the decoction, one or two fluidounces; of the extract, from five to twenty grains. A coffee made from roasted acorns, has been highly recommended in the treatment of scrofula.

Off. Prep.—Decoctum Quercûs Albæ.

QUERCUS INFECTORIA.

Dyer's Oak.

Nat. Ord.—Cupuliferae, *Richard*; Corylaceae, *Lindley*; Amentaceae, *Jussieu*.
Sex. Syst.—Monœcia Polyandria.

MORBID EXCRESCENCES — GALLS.

Description.—*Quercus Infectoria* is a small shrub, with a crooked stem, seldom exceeding six feet in height. The leaves are from an inch to an inch and a half long, on short petioles, ovate-oblong, sinuate-dentate, smooth, of a bright-green color, shining on the upper side, rounded and rather unequal at the base, and deciduous. The cup is hemispherical, scaly, and sessile, somewhat downy; acorns elongated, obtuse, and two or three times longer than the cup.

History.—Dyer's Oak, or *Gall Oak*, grows throughout Asia Minor, and, very probably, through the middle latitudes of Asia. It affords the *Gall Nuts* or *Galls* (*Galla*, U. S.) of commerce. These are produced by the puncture of the shoots and young boughs by a hymenopterous insect or fly, for the deposition of its eggs. This insect is the *Cynips Quercusfolii* of Linnæus, and the *Diplolepis Gallæ-tinctoriæ* of Geoffroy; it has a fawn-colored body, dark antennæ, and the upper part of its abdomen a shining brown. After the puncture is made, the egg is deposited in the wound, and in consequence of the irritation thus produced, a morbid secretion takes place, which concreting as it flows, forms the hard excrescences called Galls. The egg grows with the gall, is converted into a larva, which feeds upon the morbid excrescence surrounding it, and forms a cavity in its center. Toward the end of July, the young insect, having passed through all its stages of transformation into the state of a fly, eats its way out and escapes. The best galls are those which are gathered about the middle of July, when they have attained their full size, and just before the escape of the insect. They are then called *green*, *blue*, or *black galls*; those which are gathered later, after having been injured by the insect, are usually larger, less heavy and compact, and lighter-colored than the former—they are termed *White galls*, and are of an inferior quality.

Galls are imported from the Mediterranean ports, especially Smyrna and Trieste, or from London. The best kind were formerly called *Aleppo Galls*, from a supposition that they were obtained more abundantly in the vicinity of that city, but at present, it is hard to discriminate between the finer sorts from various places. An excellent article has been brought from Calcutta, of equal value with that from the Mediterranean. Galls vary in size from that of a large pea to that of a small walnut; they are roundish, tuberculated on the surface, and hollow within. The best are of middle size, dark-bluish or lead color, sometimes with a greenish tinge, whitish or brownish internally, hard, heavy, brittle, with a flinty fracture, a striated texture, and a small

cavity in the center, containing dust, the undeveloped insect, or the insect itself in the state of larva, pupa, or of fly. It forms a light yellowish-gray powder. The inferior sorts are of a lighter color, sometimes reddish or nearly white, of a loose texture, with a large cavity in the center, from which a small hole or perforation passes to the external surface, and through which the fly effected its escape. Both kinds are brittle, easily pulverized, inodorous, and have an intensely astringent taste. Water is the best solvent of galls, and proof-spirit the next; pure alcohol or ether acts more feebly upon them. All the soluble matter of galls is taken up by forty times their weight of boiling water, and the residue is tasteless; alcohol dissolves seven parts in ten, ether five parts. Upon cooling, a saturated decoction deposits a copious pale-yellow precipitate. An infusion or tincture of galls affords precipitates with muriatic, sulphuric, nitric, phosphoric, and arsenic acids, lime-water, carbonate of ammonia, carbonate of potassa, solutions of acetate and subacetate of lead, sulphates of iron and copper, nitrates of silver and mercury, tartrate of antimony and potassa, gelatin, infusions of Peruvian bark, colombo, opium, and many other vegetables, especially those containing proximate alkaline principles, with most of which tannic acid forms insoluble compounds. The infusion of galls reddens litmus paper, and is rendered orange by nitric acid, milky by corrosive sublimate, and its own color is deepened by ammonia. Galls consist of a large proportion of tannic acid; according to Davy 500 parts give 185 parts of matter soluble in water, of which 130 were tannic acid, 31 gallic acid with a little extractive, 12 mucilage and matter rendered insoluble by evaporation, and 12 saline matter and calcareous earth. Guibourt found galls to consist of 65 per cent. of tannic acid, 10.5 of lignin, 11.5 of moisture, 5.8 of gum, sugar and starch, 4.0 of gallic, ellagic, and luteo-gallic acids, beside extractive, chlorophylle, volatile oil, albumen and salts. The gallic and ellagic acids, according to M. Pelouze, do not pre-exist in the galls, but are formed by the action of atmospheric oxygen upon their tannin.

I have in my possession a specimen of an excrescence found on a plant, the name of which has not been ascertained, growing in Texas, in the neighborhood of Red river. It was presented to me by Mr. W. S. Merrell; he obtained it from a physician who had pursued the practice of his profession in that section of country, and who states that it is caused by the puncture of some insect, and is found in abundance. According to his account these morbid growths are hollow, globose, and whitish. The dried specimens which I have are of a light brown color mixed with fragments of a darker color, and appear to be pieces of a hollow body, some of which very much resemble squill in color. They are half a line and less in thickness, of various sizes, from a line to three-fourths of an inch in diameter, irregular in their shape, having an external convex surface which is very finely corrugated, and of a

shining, resinous appearance under the microscope, and an internal concave surface which is much smoother than the external one, and in which may be distinctly traced veins running in various directions. They are translucent, with the exception of the darkest colored, have a short fracture, presenting under the microscope a shining, finely granulated, waxy or resinous surface, are inodorous, brittle, of a taste at first resembling green tea, but which becomes slightly bitter and powerfully astringent; the light-colored pieces are more astringent and bitter than the dark ones. One piece of this article, about one quarter of an inch in diameter was placed in an ounce of water and agitated for a few minutes, and was not dissolved; to this about five or six grains of sulphate of iron were then added, which, on agitation, immediately turned the liquid black. This, used as an ink, formed pale lines scarcely discernible, but which, in a few minutes, became intensely black. I consider this the most powerful astringent vegetable product ever yet found in a natural state, and trust that means may be devised to introduce it into our markets.

Properties and Uses.—Galls are astringent and may be used in all cases where astringents are indicated, as in chronic dysentery, diarrhea, passive hemorrhages, and in cases of poisoning by tartar-emetic or the vegetable alkaloids, in infusion or tincture. Boiled in milk they are good for the diarrhea of children. As a local application, the infusion is employed as an injection in gleet, leucorrhea, prolapsus ani, or for a gargle in indolent ulceration of the fauces, relaxed uvula, and the chronic stage of mercurial action on the mouth; the addition of alum is said to render it more beneficial. Dose of the powder, from five to twenty grains; of the tincture half a fluidrachm to a fluidrachm; of the infusion from half a fluidounce to a fluidounce.

Off. Prep.—Acidum Tannicum; Decoctum Gallæ.

RANUNCULUS BULBOSUS.

Crowfoot.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE CORMUS AND HERB.

Description.—Ranunculus Bulbosus has a perennial, solid, fleshy, roundish, depressed *cormus* or *root*, sending out radicles from its under side; in autumn it gives off lateral bulbs near its top, which afford plants for the following year, while the old cormus decays. The root sends up annually, several erect, round, hairy, and branching *stems*, from six to eighteen inches in height, and which are furrowed, hollow, and bulbous at base. The *radical leaves* are on long petioles, ternate, sometimes quinate; the segments variously cut, lobed and toothed, hairy. The *cauline leaves* are sessile and ternate, the upper ones more simple. Each

stem supports several solitary, golden-yellow *flowers*, upon furrowed, angular and hairy *peduncles*. The *sepals* are oblong, hairy, and reflexed against the peduncle. The *petals* are five, inversely cordate, longer than the sepals, and arranged so as to represent the shape of a small cup. At the inside of the claw of each petal is a small cavity, which is covered with a minute wedge-shaped emarginate scale. The *stamens* are numerous, yellow, with oblong, erect *anthers*. *Ovaries* numerous, with reflexed *stigmas*. *Receptacles* spherical. *Carpels* acute, naked, diverging, tipped with very short recurved beaks.

History.—This plant is common to Europe and the United States, growing in fields and pastures, and flowering in May, June, and July. There are several species, possessing similar properties, and designated by the common name of *Buttercup*; among these the *R. Acris*, *R. Repens*, *R. Sceleratus*, and *R. Flammula*, may be indiscriminately substituted, the one for the other. In all these species, the active principle depends upon a volatile, acrid principle, which is dissipated by drying, or by the application of heat, and which may be separated by distillation with water. The fresh plant or root, when chewed, excites violent irritation in the mouth and throat, inflaming and even excoriating the tongue, and inside of the cheeks and lips, if not quickly discharged; and if swallowed, it produces much heat and pain in the stomach. The distilled water of *R. Flammula* is said to act as an instantaneous emetic.

Properties and Uses.—From the caustic or acrid character of these plants they are seldom used internally; but when applied externally, are powerfully rubefacient and epispastic. The *R. Bulbosus* is the officinal plant. It is employed in its recent state, in rheumatic, neuralgic and other diseases where vesication and counter-irritation are indicated. Its action, however, is so uncertain, and sometimes so violent, causing deep and obstinate ulcers, that it is seldom used. It is sometimes used by the beggars of Europe to produce and keep open sores, for the purpose of exciting sympathy. I have cured two obstinate cases of nursing sore-mouth, made by adding two drachms of the recent root, cut into small pieces, to one pint of hot water; when cold, a tablespoonful was given three or four times a day, and the mouth frequently washed with a much stronger infusion.

RESINA.

Resin or Rosin.

History.—This is the residuum after the distillation of the volatile oil from the turpentine of the *Pinus Palustris* and other pines. When the distillation is not carried too far, the rosin contains a little water. This is the officinal article, the *Resina Flava*, or yellow rosin. If, when in a state of fusion, it be strongly agitated with water, it acquires a distinct appearance, and is called *Resina Alba*, or white rosin. A more

continued heat than that prepared in making the yellow rosin expels the water, and produces transparent rosin; and if the process be pushed as far as it can, without producing a complete alteration of properties, the residue acquires a deeper color, and is termed *Brown* or *Black rosin*, *Fidler's rosin*, *Colophony*. If melted rosin be run into cold water, contained in shallow tanks, and a supply of cold water be kept up until the rosin has solidified, a pale yellow product is obtained, called *Flockton's Patent Rosin*. Rosin is translucent, yellowish, brittle, pulverizable, rather heavier than water, of a feeble terebinthine odor and taste, fusible at a moderate heat, inflammable, soluble in ether and many volatile oils, insoluble in water, partially soluble in boiling rectified spirit, and capable of uniting by fusion with wax, fixed oils, fats, and spermaceti. The concentrated acids dissolve it, especially with the aid of heat; sulphuric or nitric acids slowly convert it into *artificial tannin*. Solutions of potassa and soda partially dissolve it, forming soluble soaps, and leaving a resinous principle undissolved. Prof. Olmstead states that rosin added to lard, gives it a degree of fluidity not before possessed by the lard, and also prevents the latter forming those acids which corrode metals. If three parts of lard have one part of finely powdered rosin added, and the mixture be well stirred, without the application of heat, it softens, and so nearly approaches a fluid as to run freely when taken up on the stirring-rod, at a temperature of 72° . On melting the mixture, and setting it aside to cool, the following changes take place: At 90° it remains transparent and limpid; at 87° , a pellicle begins to form on the surface, and soon after it begins to grow slightly viscid, and as the temperature descends, it passes through different degrees of viscosity, until at 76° it becomes a dense semifluid. A compound of one part of rosin to four of lard, may be used for various purposes: by adding a portion of black-lead, and applying a thin coating to iron stoves and grates, it prevents them from rusting, forming a complete protection. It may likewise be applied to various other purposes.

Properties and Uses.—Rosin is seldom given internally. Its principal use is to form plasters and ointments, to which it is an excitant ingredient, and renders them more adhesive. The vapor from rosin has been inhaled in chronic bronchitis and affections of the lungs with benefit; and the fumes from burning rosin, if received upon the parts, will, it is said, remove the irritation attending piles and prolapsus ani. Half a drachm of powdered rosin dissolved in a sufficient quantity of chloroform, so as to make a thick solution, will relieve neuralgia of the teeth, or toothache, by introducing a piece of cotton, which has been impregnated with the solution, into the hollow teeth.

Off. Prep.—Ceratum Resinæ; Ceratum Sabinæ; Emplastrum Calefaciens; Emplastrum Plumbi Oxidi Rubrum; Emplastrum Resinæ; Emplastrum Resinæ Compositum.

RHAMNUS CATHARTICUS.

Buckthorn.

Nat. Ord.—Rhamnaceæ. Sex. Syst.—Pentandria Monogynia.

THE BERRIES OR FRUIT.

Description.—Buckthorn is a shrub from six to fifteen feet in height. The *branches* are alternate, or nearly opposite, spreading, straight, round, smooth, hard, and rigid, each terminating in a strong spine, after the first year. The *leaves* are from one to two inches long, and about two-thirds as wide, deciduous, bright-green, smooth, simple, entire, veined, ovate, serrate, and in fascicles, on short downy petioles; the young ones are downy; the earlier ones in tufts from the flowering buds, and the rest opposite, on the young branches. *Stipules* linear. The *flowers* are small, numerous, yellowish-green, on the last year's branches, and usually dicecious or polygamous; the fertile flowers have the rudiments of stamens, narrow petals, and a deeply four-cleft style; the barren ones have an abortive ovary, and broader petals. The *anthers* are small, rounded, and borne on short, subulate filaments, which are inserted in the mouth of the calyx. The *berries* are globular, about the size of a pea, bluish-black, containing a green pulp, with four cells, and as many *seeds*, which are smooth, elliptical, convex on one side and flattened on the other.

History.—Buckthorn is a native of Europe, and is found growing wild in some parts of the United States, flowering in May and June, and ripening its fruit in the latter part of September. The berries are the officinal portion. They are round, about the size of a pea, black, smooth and shining, somewhat flattened on the summit, with an unpleasant odor, and a bitter, acrid and nauseous taste. The juice of the berries stains paper green, is reddened by acids, and is rendered light-green by alkalies. On standing it ferments, acetic acid is formed, and it becomes red. A pigment, known as *Sap-green*, is made with them, by adding a little alum to the inspissated juice, or by adding lime-water and gum arabic to it, and evaporating to dryness. It contains green coloring matter, sugar, brown mucilage, and bitter extractive supposed to be its active principle. The bark of *Rhamnus Frangula*, is occasionally used in Germany as a cathartic, under the name of *Cortex Frangulæ*.

Properties and Uses.—Buckthorn berries, (*Rhamni Baccæ*) are powerfully cathartic; twenty of the recent berries cause brisk watery purging, with nausea, dryness of the throat, thirst, and tormina. These effects are partly removed by giving the juice (*Rhamni Succus*) in the form of syrup, and which formerly enjoyed much reputation as a hydragogue in gout, rheumatism, and dropsy; at present it is seldom employed in practice, and is occasionally employed as an adjunct to other cathartic and diuretic mixtures. Dose of the syrup, from half a fluidounce to a fluidounce.

RHEUM PALMATUM.

Rhubarb.

Nat. Ord.—Polygonaceæ. *Sex. Syst.*—Enneandria Trigynia.

THE ROOT.

Description.—In relation to the Rhubarb root, the scientific world is in much ignorance, not knowing the exact plant or plants from which it is produced. All that is known is, that it is the root of one or more species of rheum, supposed to be the *Rheum Palmatum* and *R. Undulatum*. The species from which the medicinal drug is obtained inhabit the great plains of Tartary, the steppes of Siberia, and the great ranges of mountains lying between these and the northern parts of India, and great caution is exhibited in monopolizing the trade in the article. Until 1732 but little was known as to the true origin of rhubarb; but at that time Jussieu and Rand received specimens from Russia which were named *Rheum Rhabarbarum* by Linnæus, under an impression that they were of the species which furnished the genuine drug; this name has since been changed to *Rheum Undulatum*. Subsequently Kaul Boerhaave obtained some seeds of a plant said to produce the root, and which upon planting yielded two distinct species, the *R. Undulatum* and *R. Palmatum*. Several other species have from time to time attracted the attention of naturalists, being reputed each as the one which furnished the genuine rhubarb of commerce, but the presumption is, that it is derived from several species of Rheum, and that the differences of character existing between the cultivated European and Asiatic roots are owing to the differences in soil, climate, mode of cultivation, etc. The rhubarb plants are herbaceous, perennial, with large branching roots, vigorous stems from four to eight feet high, with numerous, large, petiolate leaves at base, and terminating in branching panicles of numerous, small flowers. The leafstalks of the various species have a pleasant acid taste, and several of them are cultivated in the United States for the purpose of making pies and tarts, as the *R. Rhaponticum*, *R. Hybridum*, and *R. Compactum*. The method of cultivation and preparation of rhubarb in its native country is not satisfactorily known, though various statements in relation to it have been published. Lindley, in his *Flora Medica*, gives the following description of the plants which furnish rhubarb:—

Rheum Palmatum. Willd. *Sp. Plant.* ii. 489; Lindley, *Flor. Med.* p. 358; Carson, *Illust. of Med. Bot.* ii. 22, pl. 69. "Leaves roundish-cordate, half palmate; the lobes pinnatifid, acuminate, deep dull-green, not wavy, but uneven and very much wrinkled on the upper side, hardly scabrous at the edge, minutely downy on the under side; sinus completely closed; the lobes of the leaf standing forward beyond it. Petiole pale green, marked with short purple lines, terete, obscurely channeled quite at the

upper end. Flowering stems taller than those of any other species." This species is said to inhabit China in the vicinity of the great wall. It has been cultivated in England and France, for the sake of its root, which is generally admitted to approach more nearly in odor, taste, and the arrangement of its colors, to the Asiatic rhubarb than that of any other known species.

R. Undulatum. Willd. *Sp. Plant.* ii. 489; Lindley, *Flor. Med.* p. 357; Woodv. *Med. Bot.* 3d ed. v. 81. "Leaves oval, obtuse, extremely wavy, deep-green, with veins purple at the base, often shorter than the petiole, distinctly and copiously downy on each side, looking as if frosted when young, scabrous at the edge; sinus open, wedge-shaped, with the lower lobes of the leaves turned upward. Petiole downy, blood-red, semicylindrical, with elevated edges to the upper side, which is narrower at the upper than the lower end." This is a native of Siberia, and probably of Tartary and China. It was cultivated by the Russian government as the true rhubarb plant; but the culture has been abandoned. It contributes to the rhubarb produced in France.

R. Compactum. Willd. *Sp. Plant.* ii. 489; Lindley, *Flor. Med.* p. 358; Carson, *Illustr. of Med. Bot.* ii. 24, pl. 71. "Leaves heart-shaped, obtuse, very wavy, deep-green, of a thick texture, scabrous at the margin, quite smooth on both sides, glossy and even on the upper side; sinus nearly closed by the parenchyma. Petiole green, hardly tinged with red except at the base, semicylindrical, a little compressed at the sides, with the upper side broad, flat, bordered by elevated edges, and of equal breadth at each end." This plant is said to be a native of Tartary and China. It is one of the garden rhubarbs, and is cultivated in France for its root.

R. Australe. Don, *Prod. Flor. Nepal.* p. 75.—*R. Emodi.* Wallich; Lindley, *Flor. Med.* p. 354; Carson, *Illustr. of Med. Bot.* ii. 24, pl. 70. "Leaves cordate, acute, dull-green, but little wavy, flattish, very much wrinkled, distinctly rough, with coarse short hairs on each side; sinus of the base distinctly open, not wedge-shaped but diverging at an obtuse angle, with the lobes nearly turned upward. Petioles very rough, rounded-angular, furrowed; with the upper side depressed, bordered by an elevated edge, and very much narrower at the upper than the lower end." The root of this species was at one time conjectured to be the source of officinal Asiatic rhubarb; but has been found to have scarcely any resemblance to it. The plant has been cultivated both in Europe and this country, and its petioles answer well for tarts, etc.

R. Rhaponticum. Willd. *Sp. Plant.* ii. 488; Lindley, *Flor. Med.* p. 357; Loudon's *Encyc. of Plants*, p. 335. "Leaves roundish-ovate, cordate, obtuse, pale-green, but little wavy, very concave, even, very slightly downy on the under side, especially near the edge, and on the

edge itself; scabrous at the margin; sinus quite open, large, and cuneate. Petiole depressed, channeled on the upper side, with the edges regularly rounded off, pale green, striated, scarcely scabrous. Panicles very compact and short, always rounded at the ends, and never lax as in the other garden species. Flowering stem about three feet high." The Rhapontic rhubarb grows upon the banks of the Caspian Sea, in the deserts between the Wolga and the Oural, and in Siberia. It is said also to grow upon the borders of the Euxine. It is cultivated as a garden plant in Europe and this country; and large quantities of the root are produced for sale in France. It is said by Royle to be the source of the English rhubarb.—*U. S. Disp.*

Beside the above species, several others have been named, as the *R. Caspicum* from the Altai mountains, *R. Leucorrhizum* from the Tartarian Kirghese desert, *R. Speciforme*, *R. Webbianum*, and *R. Moorcraftianum*, growing on the Himalaya mountains, *R. Crassinervium*, *R. Hybridum*, etc.

History.—Among the several kinds of rhubarb found in commerce that called RUSSIAN RHUBARB, is considered the best. It was formerly derived from the Turkish ports, and in consequence received the name of *Turkey Rhubarb*; and has likewise been called by the several names of *Persian*, *Moscow*, *Bucharian*, or *Siberian Rhubarb*. It is prepared in Tartary, from which place it is conveyed to a town of Kiachta where it undergoes a rigid inspection by an apothecary appointed by the Russian government, who burns the inferior pieces, and forwards the remainder to St. Petersburg, where it is again sorted and shipped for other countries. It is in irregular, roundish cylindrical or flat plano-convex pieces, usually from one to three inches in breadth, always obscurely angular, owing to the bark of the root together with a small portion of the substance immediately beneath the bark, having been apparently sliced off longitudinally with a knife, and with large perforations, frequently extending only to the center, and evidently made to ascertain the soundness of the article at the time of inspection. Their external surface is yellow, and thinly covered with a yellow powder, caused probably by the friction or rubbing together of the pieces; and when scratched with a knife, they give a bright yellow streak. They have rather a compact texture, an uneven fracture exposing a surface beautifully marbled with irregular, waving, grayish and reddish veins. They are easily pulverizable, giving a bright yellow powder. Russian rhubarb has a peculiar, aromatic, bitter, faintly astringent taste, and a strong, peculiar odor; it tinges the saliva yellow, and produces a crackling, or sense of grittiness between the teeth, owing to crystals of oxalate of lime, which are largely contained in it. These crystals may be seen under the microscope by previously boiling thin slices of the root in water until soft, and then crushing and agitating them in the water; in 100 grains Mr. Quekett found between 35 and 40 grains of these minute crystals.

THE CHINESE or EAST INDIAN RHUBARB is brought from Canton; the finest quality of it, termed *Batavian* or *Dutch-trimmed Rhubarb*, very much resembles the Russian Rhubarb in appearance. That which is brought to this country, however, as Chinese Rhubarb, consists of irregular cylindrical or roundish pieces, sometimes flattened on one or both sides, and never angular, like Russian or Dutch-trimmed Rhubarb, of a duller yellow color than the former variety, and presenting an external appearance as if the bark had been removed by scraping or rasping, and the surface rendered smooth and somewhat powdery by attrition. Their density is somewhat greater than that of Russian Rhubarb, and their texture more compact; but the appearance of a fresh fracture is very nearly the same. They are usually perforated, and the holes frequently contain fragments of cord by which they were suspended during the drying process. They are not of such uniform quality as the Russian article, being often imperfectly stripped of their bark, and more or less attacked by insects, moldiness, or other impurity. The color, odor, taste and grittiness are very nearly, if not precisely the same as those of the Russian drug. Their powder is yellow, with a reddish-brown tinge, but in the finer kind it is hardly discernible from the powder of Russian Rhubarb. The major portion of the rhubarb consumed in this country is the Chinese variety; it is somewhat inferior to the Russian, but is less expensive, and when of good quality is sufficiently active to answer all medical purposes.

EUROPEAN RHUBARB is obtained from England, France, Belgium, and Germany. That which is imported into this country comes principally from England and France. *English Rhubarb* is obtained from the roots of *Rheum Rhaponticum*, which is cultivated in various parts of the country, but chiefly in Oxfordshire near Banbury. It is collected in October and November from plants three or four years old. The pieces, as seen in this country, are of various shape and size, sometimes cut and perforated to resemble the Russian, frequently cylindrical, five or six inches long, by an inch or less in thickness, more commonly flat, or somewhat lenticular, and quite large. It has an external reddish hue, and brownish spots of adhering bark, and internally a looser, softer, and more spongy texture than the others, with occasional cavities, especially in the center. It is more easily scratched with the nail, and yields a lighter yellow streak; and the surface of a fresh fracture shows the same marbled red and gray lines, but generally more straightly radiated from the center. It has a mucilaginous, astringent taste, with little bitterness and a flavor similar to Eastern Rhubarb, but much more feeble in odor, more mucilaginous, and without any grittiness between the teeth. The long or inferior pieces are often met with in this country, and are called *Stick-rhubarb* in England. These are principally used for adulterating the finer Eastern varieties, when in powder.

FRENCH RHUBARB, also called *Rhapontic Rhubarb*, or *Krimea Rhubarb*, is made in abundance at an establishment called Rheumpole, near the port of L'Orient, from the roots of *Rheum Rhaponticum*, *R. Undulatum*, and *R. Compactum*. It bears some resemblance externally to Chinese Rhubarb, but has neither its odor, nor aromatic taste. Its properties are very similar to the English variety, and like that, it is often used to adulterate the powder of true eastern rhubarb.

A mere reference to other varieties of rhubarb will be sufficient here. The *Himalaya* or *Emodi Rhubarb*, from the *Rheum Astrale*, and other species growing in the Himalaya mountains, is brown, fibrous, inodorous, and inferior, yet is said to be nearly as active as the Chinese. The Russian traveler, Pallas, describes a *White or Imperial Rhubarb* as being a superior article, of white color, and sweetish taste; but according to Dr. G. Walpers, who has made some inquiries in relation to it, it proves to be one of those fabulous sayings, in which, unfortunately, some travelers are very apt to indulge.

Good rhubarb may generally be known by being of a lively color, moderately compact and heavy, of an aromatic odor, of a bitter and astringent, not mucilaginous taste, and by feeling gritty, and staining the saliva bright yellow; it should be brittle, presenting a marbled appearance of reddish and yellowish veins intermingled with white, when freshly broken, and affording a bright yellow powder, perhaps with a slight reddish-brown tinge. When very compact and heavy it is inferior; when very light it may be rotten or worm-eaten. Inferior rhubarb is often colored with turmeric, which may be detected by solution of boracic acid, which turns turmeric-yellow to brown, but does not affect the yellow color of the true rhubarb. When in powder, the adulterations of rhubarb are very difficult, if it all possible, to detect. Water, either cold or boiling, extracts the active properties of rhubarb, and the infusion is of a dark reddish-yellow color, with the peculiar odor and taste of rhubarb; and the residue becomes whitish, tasteless and inodorous. Long boiling impairs its virtues. The infusion prepared by percolation with cold water, is preferable to that obtained with boiling water alone, as this last becomes turbid on cooling, owing to a partial separation of some of the principles of the root; this may be prevented, however, by the addition of a little spirit. Proof spirit is a more ready solvent of the active ingredients of rhubarb than water. Nitric acid added to an infusion of Russian rhubarb in twenty parts of water, causes a dense muddiness, and slowly a yellow precipitate, owing to the separation of rhabarbarin; tincture of iodine causes a tawny muddiness, probably for a similar reason; solution of potassa combines with the rhabarberin and produces a fine blood-red color; and lime-water causes at first a pale cherry-red haze, which slowly gives place to a red precipitate composed of rhabarberin and lime. Sesquichloride of iron pro-

duces a green precipitate, and solution of isinglass a yellow curdy deposit, owing to the presence of tannin. Chinese Rhubarb is affected in the same way by the above reagents. Rhubarb has been analyzed by several chemists, and with various results. In 1836 Brandes found the Eastern drug to consist of 2 per cent. of pure rhabarbaric acid or rhabarbarin, 7.5 of the same acid impure, 2.5 of gallic acid, 9 of tannin, 4 starch, 11 of uncrystallizable sugar in union with tannin, 14.4 of gummy extractive, 3.5 of coloring extractive, 4 of pectic acid, 11 of oxalate of lime, 1.1 of malate and gallate of lime, 1.5 of sulphate of potassa and chloride of potassium, 1 of silica, 0.5 of phosphate of lime and oxide of iron, 25 of lignin, and 2 of moisture. The principles indicated by previous investigators, under the names *Rhein*, *Rheumin*, *Rhabarbarin*, and *Caphopierite*, appear to be complex bodies, consisting of the *Rhabarbaric acid* of Brandes combined with other principles. It may be obtained by purifying the alcoholic extract of rhubarb with cold water, drying the residue, dissolving it in the smallest possible bulk of spirit, and then adding ether so long as it separates anything. The ether is then to be distilled off, and the residue again similarly treated with spirit and ether. The solution yields it pure by spontaneous evaporation. It is granular, yellow, tasteless and inodorous, fusible, partially volatile, sparingly soluble in water, more so in alcohol or ether, and acid in its reactions. Alkaline solutions dissolve it forming intensely red solutions, from which acids separate it as a yellow precipitate, and which, with the earthy salts, give yellow precipitates of the principle, united with an earthy base. Ultimate analysis shows that it is identical with a coloring matter (chrysophanic acid) obtained by Rochleder from the yellow lichen *Parmelia Parietina*.

Schlossberger and Dœpping, in a recent and elaborate analysis, have, in addition to the above principles, also discovered three coloring principles, which are freely soluble in alcohol, slightly soluble in water, and hold an intermediate place between resin and extractive matter. Two of these were uncrystallizable, one of which was *brown* and the other *red*, and were named *Phæoretin* and *Erythroretin*; the other formed in granular crystals, and was named *Chrysophanic acid*. *Aporetin* was the name given to another resinous substance, which was insoluble in the alcohol from which it had been precipitated by ether, and isomeric with phæoretin, it was supposed to be a product of the operation. These three principles were obtained by pursuing the above-named process for rhabarbaric acid, and dissolving the yellow precipitate, had by evaporation, in alcohol; the insoluble portion is *aporetin*, and the *phæoretin* is taken up by the alcohol, from which it may be separated by evaporation. It is a yellowish-brown powder, very slightly soluble in water or ether, freely soluble in alcohol and alkaline solutions, with which it produces an intense reddish-brown color, and which is precipitated yellow by the mineral acids. The ethereal solution of the alcoholic extract,

after all the aporetin and phæoretin had been separated was allowed to separate spontaneously, and a large quantity of beautiful yellow crystalline granules of *chrysophanic acid* was obtained, possessing properties the same as named above for rhabarbaric acid. When the deposition of these granules ceased, the ethereal solution was evaporated, which yielded the *red resin* or *erythroretin*, and which formed beautiful purple combinations with potassa or ammonia. The cathartic principle of rhubarb has not yet been isolated, and is supposed to be more or less volatile.

The *incompatible substances* with an infusion of rhubarb, are gelatin, most of the acids, the salts of sesquioxide of iron, acetate of lead, nitrate of protoxide of mercury, nitrate of silver, protochloride of tin, lime-water, solutions of quinia, tartar emetic, sulphate of zinc, corrosive sublimate, etc.

Properties and Uses.—Rhubarb is cathartic, astringent and tonic; as a cathartic, it acts by increasing the muscular action of the intestines, rather than by augmenting their secretions, and affects the whole intestinal canal, especially the duodenum. Its cathartic effect is succeeded by a mild astringency, which has gained for rhubarb the reputation of being secondarily a calmative, as well as a stimulant of the digestive canal; with its astringent influence, it likewise exerts, for the most part, a tonic action on the stomach, improving the appetite and digestive powers. It is absorbed in the course of its operation, making the serum of the blood yellow, the sweat tawny, and the urine red, which may be distinguished from bloody urine by heating it. If blood be present it will coagulate, and remove the red color, which will not happen if the tint be owing to rhubarb. Rhubarb is much used as a laxative for infants, in many infantile diseases; its mildness and tonic qualities rendering it peculiarly applicable, especially when enfeebled digestion and irritation of the alimentary canal are present. In acute or chronic diarrhea or dysentery, in convalescence from exhausting diseases, and in some irritable habits where the mildest of all other laxatives are apt to excite hypercatharsis, rhubarb is an appropriate medicine. Its combination with soap or an alkali tends to counteract its astringent effects, and it thus becomes valuable in cases of constipation. It is useful in all cases of fecal accumulations, as it produces fecal, more than watery discharges. Sometimes it produces griping, which may be obviated by aromatics. The following pill I have found very beneficial in dyspepsia attended with constipation, chronic diarrhea and dysentery, habitual constipation, hepatic derangements, piles, etc.—Take of extract of rhubarb, leptandrin, hydrastin, and castile soap, of each, half a drachm, mix them well together, and divide into thirty pills; of these, one, two, three, or four may be taken daily, sufficient to keep the bowels regular, without causing catharsis. When more than one are required daily, they should be given in doses of one pill at a time at regular intervals

through the day. Rhubarb is generally contra-indicated in cases attended with much inflammatory action. Toasting it, destroys much of its purgative power, while its astringency remains the same, and it is, thus prepared, recommended by some practitioners in diarrhea, dysentery, cholera morbus, and other diseases where astringents are indicated.

Dose of the powder as a purgative, from ten to thirty grains; as a laxative, from five to ten grains; as a tonic, from one to five grains; of the tincture or syrup, one or two fluidrachms.

Off. Prep.—Extractum Rhei; Extractum Rhei Fluidum; Extractum Rhei et Potassæ Fluidum; Infusum Rhei; Pilulæ Leptandrini Compositæ; Pulvis Rhei Compositus; Tinctura Rhei.

RHODODENDRON CHRYSANTHUM.

Yellow Rhododendron.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—This is a small bush, with the *stem* from a foot to a foot and a half high, with numerous, decumbent, spreading branches, covered with a brown bark. The *leaves* are few, alternate, of the texture of a laurel leaf, terminal, ovate, somewhat acute, tapering into the stalk, reticulated and rough above, of a dark-green color, paler, or somewhat ferruginous and smooth underneath, with their margins entire and involute. The *flowers* are large, showy, nodding, yellow, supported on long peduncles, and varying in number in each cluster from five to ten. The *calyx* is inferior, persistent, and deeply five-cleft. The *corolla* is campanulate, five-cleft, with rounded segments, nearly equal, and spreading, the three upper ones somewhat the largest, and streaked with livid dots next the tube, the two lower unspotted. The *stamens* are ten, with unequal, filiform, declining *filaments*, and oblong incumbent *anthers*. The *ovary* is five-sided, with a long slender style terminated by a five-lobed stigma. The *capsule* is ovate, somewhat angular, not tomentose, five to ten-celled, containing numerous minute, irregular seeds.

History.—Rhododendron is a beautiful evergreen shrub, a native of the mountains of Siberia, with large, yellow flowers, which appear in June and July. The leaves are the parts used in medicine, and should be collected in September, when the capsules are ripe. When dried, they are inodorous, but have an austere, astringent, bitterish taste, and yield their virtues to water or alcohol. The decoction has an unpleasant odor, and a rough, bitter, and acrid taste. The leaves have not been analyzed. Our native species, the *R. Maximum*, and *R. Punctatum*, according to Barton, possess properties similar to the *R. Chrysanthum*, but milder; according to Bigelow they are astringent, but not narcotic.

Properties and Uses.—Yellow Rhododendron is narcotic, stimulant, and diaphoretic; when first taken, the action of the heart and arteries is increased, followed by a diminished frequency of the pulse; large doses produce emeto-catharsis, and delirium. They are recommended in infusion, in chronic rheumatism, gout, syphilis, and palsy; two drachms of the dried leaves being infused in ten fluidounces of hot water, for twelve hours, in a close vessel. The liquor is then strained and taken in the morning, one-fourth of it every four hours, and the patient kept in bed; a repetition of the dose three or four days successively, generally effects a cure. It occasions a sensation of heat, with a species of intoxication, and a peculiar creeping or pricking, and uneasy sensation in the affected parts, which subsides in a few hours, leaving the parts free from pain. It is a valuable remedy, used in Russia, Germany, and sometimes in France and England, but not in this country.

RHUS GLABRUM.

Sumach.

Nat. Ord.—Anacardiaceæ. *Sex. Syst.*—Pentandria Trigynia.

THE BARK AND FRUIT.

Description.—As there are several species of this genus which possess poisonous properties, some care should be employed in distinguishing them apart. *Rhus Glabrum*, or *Smooth Sumach*, is a shrub from four to fifteen feet in height, consisting of many straggling, glabrous branches, with a light-gray or somewhat reddish bark. The *leaves* are upon smooth petioles, and consist of from six to fifteen pairs of opposite leaflets, with an odd one at the extremity, all of which are lanceolate, acuminate, acutely serrate, glabrous, green on their upper surface and whitish beneath, sessile except sometimes the terminal odd one, about three inches long, and one-fourth as wide; in the autumn their color changes to a beautiful red. The *flowers* are greenish-red, and disposed in large, erect, terminal, compound thyrses, and are succeeded by clusters of red berries, covered, when mature, with a crimson down, which is extremely sour to the taste, owing to the presence of malic acid in combination with lime.

History.—*Rhus Glabrum*, sometimes called *Upland* or *Pennsylvania Sumach*, is found in almost all parts of the United States, growing in old neglected fields, along fences, and on the borders of woods, flowering in June and July, and maturing its fruit in the early part of autumn. The bark and berries are officinal; the latter should be collected before their acid efflorescence is washed away by the rain. They have an acid, astringent, not unpleasant taste. The bark and leaves are astringent, and have been used in dying and tanning leather; when broken from the plant, a milky juice exudes from them, which concretes into a

gummy substance. The excrescences which form upon the leaves, contain large quantities of tannic and gallic acids, nearly resembling galls in character, and are fully equal to them in medicinal action.

Malic acid may be obtained from the berries by the following process: Pour boiling water on the ripe berries, and let them macerate for twelve hours; then strain, evaporate to one-fourth, and again strain; resume the evaporation and continue it till the liquid assumes the consistence of thin syrup, when it may be set aside to crystallize. Wash the crystals of bimalate of lime which are formed, with a little water, and recrystallize from a boiling solution. Dissolve the salt in hot water, and decompose it with a solution of acetate of lead. Wash the precipitated malate of lead, suspend it in water, and pass sulphureted hydrogen through the liquid until the whole of the lead is separated. Lastly, filter and evaporate to dryness in a porcelain vessel. Malic acid thus prepared may be used for obtaining the malates of iron or of manganese.

The Pharmaceutical Institute of New York city profess to have obtained from the leaves of the *Rhus Glabrum*, the active principle of the plant, which they term *Rhusine*. It is said to be prepared by percolation with alcohol of specific gravity 0.830, and then displace the solvent by means of a vacuum apparatus. The *Rhusine* is then precipitated and washed with distilled water, dried on filter-cloth, in an airy, dry room, and reduced to a fine powder. (*See Eclectic Journal of Medicine, Rochester, Vol. IV, No. VI, page 232.*) It is said to be a light brown powder, soluble in hot water, insoluble in alcohol and having a slightly bitter taste. I have not been able to procure any of it, nor a more detailed account of its preparation. Both the bark and berries of Sumach yield their active properties to water.

Properties and Uses.—Sumach bark is tonic, astringent and antiseptic; the berries are refrigerant and diuretic. In decoction or syrup, the bark of the root has been found valuable in gonorrhea, leucorrhea, diarrhea, dysentery, hectic fever and scrofula. Combined with the barks of Slippery Elm and White Pine, in decoction, and taken freely, it is said to have proved highly beneficial in syphilis. Externally, the bark of the root in powder, applied as a poultice to old ulcers, forms an excellent antiseptic; a decoction may also be used in injection for prolapsus uteri and ani, and leucorrhea, and as a wash in many cutaneous diseases; simmered in lard it is valuable in scald-head. A decoction of the inner bark of the root is serviceable in the sore-mouth resulting from mercurial salivation, and is much used internally in mercurial diseases. The berries may be used in infusion in diabetes, strangury, bowel-complaints, febrile diseases, etc., as a gargle in quinsy, and ulcerations of the mouth and throat; and as a wash for ringworms, tetter, offensive ulcers, etc. The excrescences which form upon the leaves of the sumach, are nearly equal in astringency to galls, and if pulverized and made into an ointment with lard, they afford a soothing application for piles. The gum

which exudes from the bark on being punctured, during the summer, is beneficial in gonorrhea, gleet, obstruction of the urine, and leucorrhea; the following is a good preparation, which increases the secretion of urine, and lessens its burning or scalding: Take of gum sumach, and Canada balsam, of each, equal parts, form into four-grain pills with a sufficient quantity of powdered pokeroor; dose, one or two pills, three times a day. Dose of the decoction of sumach, from one to four fluid-ounces.

There are several varieties of this plant, as the *R. Typhinum*, Stag-horn or Velvet Sumach; and the *R. Copallinum*, Mountain or Dwarf Sumach, which possess similar virtues, and which must be carefully distinguished from those which possess poisonous properties. The non-poisonous species have their fruit clothed with acid crimson hairs, and their panicles are compound, dense, and terminal; the poisonous varieties have axillary panicles, and smooth fruit.

Rhusine is said to be tonic, astringent, and antiseptic; and to be of service in diarrhea, dysentery, and bowel diseases generally, in doses of one or two grains, every two, three or four hours, to be given after the exciting cause of these diseases has been removed by other agents.

Off. Prep.—Decoctum Rhûs Glabri; Extractum Rhûs Fluidum.

RHUS TOXICODENDRON.

Poison Oak.

Nat. Ord.—Anacardiaceæ. *Sex. Syst.*—Pentandria Trigynia.

THE LEAVES.

Description.—There are three species of *Rhus*, common to this country, which are poisonous, viz: the *Rhus Toxicodendron*, *Rhus Venenata*, and *Rhus Pumilum*. They possess similar medicinal virtues, in a greater or less degree, and should be known to every physician.

RHUS TOXICODENDRON, or *Poison Oak*, is a creeping shrub from one to three feet high, the root of which sends up many *stems*, which are either erect, decumbent, or when they meet support, ascend a wall, fence, or tree, in the same manner as ivy, by radicles thrown out at intervals. The *bark* is of a brownish-gray color. The *leaves* are ternate, on long semicylindrical petioles; they vary considerably, in the erect varieties being usually entire, or variously and irregularly sinuate-toothed or lobed, while in the climbing kinds they are almost entire or nearly so; in all cases they are smooth on the upper surface, but more or less pubescent beneath. The *leaflets* are from two to six inches long, and about two-thirds as wide, ovate or rhomboidal, acute, entire, or sinuate-dentate, petiolate; the lateral leaflets are always inequilateral, nearly sessile, and smaller than the central ones. The *flowers* are small, greenish-white, dicecious, and grow in lateral, usually axillary, racemose,

subsessile panicles. The barren flowers have a *calyx* of five erect, acute segments, and a *corolla* of five oblong recurved petals; *stamens* erect with oblong anthers; in the center is a rudiment of a style. The fertile flowers are about half the size of the preceding, with calyx and corolla similar, but more erect. They have five small abortive stamens, and a roundish ovary, crowned by a short, erect style bearing three small, cordate stigmas. The *fruit* is a globular, smooth, dry berry, of a pale-green color approaching to white, and which contains a single bony seed.

Rhus Radicans or *Poison Ivy*, and sometimes *Poison Vine*, is considered by botanists to be merely a variety of the above species; it has a climbing *stem* from three to twenty or more feet in length, and ascends trees, rocks, and other objects, to which it adheres by means of myriads of radicating tendrils thrown out from its sides. The *leaves* are smooth on both sides, sometimes pubescent on the veins underneath. In other respects it resembles the *R. Toxicodendron*. *Rhus Toxicodendron* grows in woods, fields, and along fences from Canada to Georgia, flowering in June and July. When wounded, it emits a milky juice which becomes black on exposure to the air, and leaves upon linen or cloth, a stain which deepens by age, and which cannot be removed by soap and water, or alcohol. Ether dissolves it. It has been proposed as an indelible ink.

The *Rhus Venenata* or *Poison Sumach*, also known as *Poison wood*, *Poison ash*, and inappropriately as poison-elder, and poison dog-wood. This has been confounded with the *Rhus Vernix* of Linnæus, a species which grows in Japan. It is a shrub or small tree, from ten to fifteen and sometimes thirty feet in height, with the trunk from one to five inches in diameter, and branching at the top. The *bark* of the trunk is dark-gray, paler on the branches, and red on the extreme twigs and petioles. The *leaves* are pinnate, with from three to six pairs of opposite *leaflets*, and an odd terminal one, which are oblong or oval, entire or slightly sinuated, acuminate, smooth, paler underneath, and nearly sessile, except the odd terminal one; they are about three inches long, and nearly half as wide. The *flowers* are dicecious and polygamous, very small, green, and in loose, axillary, pedunculate *panicles*. The panicles of the barren flowers are downy, the largest and most branched. *Sepals* five, ovate; *petals* five, oblong; *stamens* longer than the petals, and projecting through their interstices; the rudiment of a three-cleft style in the center. In the fertile flowers, the panicles are much smaller, sepals and petals resemble the last, while the center is occupied by an oval *ovary*, terminated by three circular *stigmas*. The *fruit* is a bunch of dry berries or drupes, about the size of peas, smooth, greenish-yellow or greenish-white, sometimes marked with slight purple veins, and becoming wrinkled when old; roundish, a little broadest at the upper end, and compressed, containing one white, hard, furrowed seed.

Rhus Venenata grows in swamps and low grounds, from Canada to Georgia, and flowers in June and July ; it is sometimes termed *Swamp Sumach*. It furnishes an opaque whitish juice when wounded, which becomes permanently black on exposure, and which may, by sufficient boiling, be made to afford a brilliant, glossy, durable varnish, very analogous to that obtained in Japan from the *Rhus Vernix*. It is much more poisonous than the previous species, and its volatile principle taints the air for some distance around with its pernicious influence, producing in many persons severe swellings of an erysipelatous nature ; sometimes the body becomes enormously swollen, and the patient unable to move. Some persons are hardly or not at all affected even by handling it. The affection caused by it, generally subsides spontaneously after several days, and may be treated in the same manner as named for the poisonous effects of the *R. Toxicodendron*.

The *RHUS PUMILUM* is considered the most poisonous of the genus. It grows about a foot in height, and may be distinguished by its pubescent branches and petioles, its pinnate leaves, with many pairs of oval, nearly acuminate, incised-dentate leaflets, downy beneath, and by its silky fruit. It is a southern species, growing in Upper Carolina.

History.—Although all parts of the *Rhus Toxicodendron* are, probably, possessed of active properties, yet the leaves only are officinal. They are inodorous, have a mawkish acrid taste, and yield their virtues to water or alcohol. The best preparation for medical use is a saturated tincture of the recent leaves, and which should be kept well corked. They have not been satisfactorily analyzed, though known to contain tannic and gallic acids.

Properties and Uses.—The fresh juice of the Poison Oak is powerfully irritant. In some persons it produces vesication wherever it is applied, accompanied sometimes by much symptomatic fever,—and even the emanations from the plant are alleged to have the same effect on certain constitutions. To remove these effects, the parts may be bathed with a solution of borax or copperas, or a wash made by boiling the bark of the elder in buttermilk ; accompanied with a light cooling regimen, and cooling purgatives or diuretics. The bruised leaves of the *Collinsonia Canadensis*, externally, and an infusion of the *Verbena Urticifolia*, internally, have been successfully used in internal or external poisoning by these plants. In large doses the leaves and juice are narcotico-irritant, and in small doses, they are diuretic, diaphoretic, laxative, and a stimulant of the nervous system. It is said they produce twitchings of paralyzed muscles, and prickings of the affected limb, similar to strychnia or nux vomica. They have been highly recommended in chronic paralysis, chronic rheumatism, cutaneous diseases, and some diseases of the eye ; it is seldom used on account of its poisonous consequences and the volatility of its active principle. I have derived much advantage from

the following preparation in paralysis, chronic rheumatism, and some obstinate cutaneous affections: Take of a saturated tincture of the fresh leaves of *Rhus Toxicodendron* half a fluidounce, saturated tincture of *Aconitum*, volatile tincture of *Guaiaacum*, of each, two fluidrachms; mix together. Of this give forty drops every three or four hours, having previously evacuated the bowels. *Rhus Toxicodendron* has been employed successfully in paraplegia without any actual organic lesion, likewise in paralysis of the bladder and of the rectum. Dose of the leaves, in powder, half a grain three times a day, gradually increased until some effect is produced; of the saturated tincture from five to ten drops.

Off. Prep.—Tinctura Rhûs Toxicodendri.

RIBES NIGRUM.

Black Currant.

Nat. Ord.—Grossulaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE FRUIT.

Description.—The Black Currant is a woody bush or shrub from three to five feet in height, *stems* unarmed, and the *leaves* from three to five lobed, punctate beneath, dentate-serrate, longer than their petioles. *Racemes* lax, hairy, somewhat nodding. *Calyx* campanulate, with reflexed segments; *petals* oblong, yellowish; *bracts* minute, subulate or blunt, nearly as long as the pedicels. *Fruit* large, roundish-ovoid, nearly black.

RIBES RUBRUM, or common *Red Currant*, has unarmed, straggling or reclined *stems*, with *leaves* obtusely three to five-lobed, smooth above, pubescent beneath, subcordate at base, margin mucronately serrate. The *racemes* are from lateral buds distinct from the leaves, pendulous, and nearly glabrous. *Bracts* blunt, shorter than the pedicels. *Calyx* flattened out, short, spreading, with obtuse lobes; *petals* obcordate, green. *Fruit* globose, smooth, red.

History.—The *Black Currant* is a native of Europe and Siberia, growing in woods, cultivated in Europe and this country, and flowering in May. The *Red Currant* grows in cold damp woods and bogs in this country and Europe, and is extensively cultivated in gardens; it also flowers in May. The fruit of these two plants, is the part used, and imparts its virtues to water. The juice of *Red Currants* is said to contain citric acid, malic acid, sugar, vegetable jelly, gum, and extractive; that of *Black Currants* contains the same, with the addition of a peculiar volatile principle, and a violet coloring matter.

Properties and Uses.—The juice of these berries, especially of the black currant, is said to be diuretic and diaphoretic. They may be made into a jelly, a jam, paste, etc., and are very useful in febrile and

inflammatory cases, in hoarseness and affections of the throat. The raw juice is an excellent refrigerant beverage in febrile diseases. A decoction of the bark of the black currant has proved useful in calculous affections, dropsy, and hemorrhoidal tumors. The wild black currant, *Ribes Floridum*, of this country, possesses similar properties. It is a handsome shrub, growing from three to five feet high, with *leaves* one or two inches long, and somewhat wider, subcordate, from three to five lobed, *lobes* acute, spreading, sprinkled on both sides with yellowish, resinous dots, just visible to the naked eye. *Flowers* greenish-yellow, subcampanulate, in pendulous, pubescent, many flowered *racemes*. *Calyx* cylindrical; *bracts* linear, longer than the pedicels; *petioles* one or two inches long. *Fruit* obovoid, smooth, black, insipid. It flowers in May and June.

ROBINIA PSEUDO-ACACIA.

Locust Tree.

Nat. Ord.—Fabaceæ, or Leguminosæ. *Sex. Syst.*—Diadelphia Decandria.

THE BARK AND LEAVES.

Description.—This is a tree from forty to fifty, and in favorable situations, eighty feet in height, with a diameter of from one to four feet, and covered with a darkish-colored rough bark. The *branches* are numerous, and armed with short, strong spines. The *leaves* are unequally pinnate; the *leaflets* are from four to eight or twelve pairs, with an odd one at the end, ovate, and oblong-ovate, thin, nearly sessile and very smooth, with minute, setaceous, partial *stipules*, and of a bright green color. The *flowers* are produced from the sides of the branches, in long pendulous racemes, are numerous, white, fragrant, and are succeeded by compressed *pods* or legumes, about three or four inches in length, and half an inch in width, and containing five or six brown, hard, reniform seeds. When young, the tree is armed with thorns which disappear in its maturity.

History.—This tree, known also by the names of *Black Locust*, and *Yellow Locust*, is found in many parts of the United States, principally west of the mountains, being seldom found north of Pennsylvania, or in the Atlantic Southern States; it blossoms in May. It is highly esteemed for the durability, hardness and lightness of its wood. The bark and leaves are used, and yield their properties to water or alcohol. The bark of the root is the most active. The seeds are sub-acrid, and furnish a large quantity of oil on expression; by infusion in water, they become perfectly mild, and afford an excellent farina. The inner bark is fibrous, and capable of being spun. No analysis has been made of this tree.

Properties and Uses.—The bark of the root is sweetish, but emetic and cathartic ; in small doses, tonic. An ounce of the bark boiled in three gills of water operates as a cathartic in doses of half an ounce, given morning and evening. The bark is supposed to possess some acro-narcotic properties, as the juice of it has been known to produce coma and slight convulsions. The flowers possess antispasmodic properties, and form an excellent and agreeable syrup. The leaves operate mildly and efficiently as an emetic, in doses of thirty grains every twenty minutes.

ROCCELLA TINCTORIA.

Litmus.

Nat. Ord.—Lichinales. *Sex. Syst.*—Cryptogamia Lichens.

A PECULIAR COLORING MATTER.

Description.—*Roccella Tinctoria*, or *Orchilla-weed*, is a small dry lichen, with a rounded, glaucous, nearly erect *thallus*, forked and subdivided into numerous, branchy, roundish, gray, yellowish or brownish threads ; *apothecia* scattered and elevated ; *disk* flat, *cæsius*, pruinose, as broad as the border.

History.—This lichen abounds on alpine or maritime rocks in various parts of the world, and chiefly upon the European and African coasts, and the neighboring Madeira, Canary, Cape de Verds, etc. islands. It contains a resinoid matter, a waxy principle, mucilaginous extractive, lichenin, oxalate of lime and various other salts, and Roccellic and Erythric acids. Litmus was formerly obtained from this plant alone, but other lichens have now in a great measure supplanted it, as the *Roccella Fusiformis* or *Angola-weed*, from Angola and Madagascar, the *Lecanora Tartarea* or *Tartarean Moss*, from Norway and Sweden, the *Variolaria Dealbata* from Auvergne and the Pyrennees, and some others. The principles in these plants upon which their properties depend, are themselves colorless, and yield coloring substances by the reaction of water, air, and ammonia ; they are generally acids.

Lacmus or *Litmus* is prepared chiefly in Holland. It is made by coarsely powdering the lichen, and then placing it in close wooden vessels, containing urine, lime, and potassa or soda mixed together, allowing it to macerate for several weeks, with occasional agitation. Fermentation takes place, the mass becomes red and then blue, is mixed with calcareous or siliceous matter to give it consistence, and with indigo to deepen the color, and placed into small molds to harden. It is in rectangular cakes from a quarter of an inch to an inch in length, light, friable, finely granular, of an indigo blue or deep violet color, and scattered over with white saline points. It has the combined odor of indigo and violets, tinges the saliva a deep blue, and is somewhat pungent

and saline to the taste. It is reddened by acids, and restored to its original blue color by alkalies.

Properties and Uses.—Litmus is much used in investigations of the urine, and other analyses, as one of the most delicate tests of uncombined acids, which change its blue color to red; and of alkalies which restore the reddened litmus to its original hue. It is used either in infusion, or in the form of litmus paper. The infusion, called *Tincture of Litmus*, is prepared by adding one part of litmus to twenty of distilled water, boiling it, and then adding two parts of alcohol to preserve it. Litmus paper is prepared by first boiling for half an hour, one part of litmus with four of water, and thus forming a strong and clear decoction; then by means of a brush, apply it to only one surface of white, unsized paper, carefully dry it, and then keep it in well-closed vessels, and not exposed to the action of the light.

Orchil or *Archil*, is the lichen, turned to a violet or deep reddish-purple color. It is in the form of a thickish liquid, or consists of a confused mass of violet-colored threads. It is prepared by macerating lichens, in a covered wooden vessel, with an ammoniacal liquor, either consisting of stale urine and lime, or prepared by distilling an impure salt of ammonia with lime and water. *Cudbear* is prepared in the same manner as *Orchil*; but after the development of the color, it is dried and pulverized, forming a purplish-red powder. The difference in the preparation of these dye-stuffs and litmus, is that in the latter, potassa or soda, is added to the ammoniacal liquid used.

ROSA CANINA.

Dog-Rose.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Polygynia.

THE RECENT FRUIT.

Description.—This plant, also known by the names of *Hip-tree*, or *Wild-brier*, is a soft, branched, smooth bush, with long green curved rootshoots, which are covered with equal, remote, strong, compressed, falcate prickles; the leaflets are from five to nine, ovate, firm, without glandular pubescence, with acute, incurved and often double serratures. The flowers with leafy bracts. *Sepals* partly pinnated, usually naked as well as the tube of the calyx. *Petals* white or pink, obcordate, fragrant; *throat of the calyx* thick and quite closed up. *Fruit* red, succulent, ovoid, truncated in consequence of the fall of the sepals.

History.—This plant is a native of Europe, and introduced into this country; it usually attains the height of eight or ten feet, and flowers in June and July. The flowers are succeeded by a scarlet fruit called *Hip*. The fruit, (*Rosæ Fructus*,) is the only officinal part, it is inodorous, but possesses a rather pleasant, sweetish, acidulous taste, which is increased

by the action of frost. The hip or fruit consists of the developed tube of the calyx, inclosing within its cavity numerous carpels or true fruits; these must be carefully removed before it is used for pharmaceutic purposes. It then, after having been dried, consists of gum, citric acid, impure malic acid, a large proportion of uncrystallizable sugar, various salts, and traces of wax, resin, and volatile oil. Its properties are preserved by beating the pulp with sugar.

Properties and Uses.—The conserve made by beating the pulp with sugar, is called Conserve of Dog-Rose, or Conserve of Hips, (*Confectio Rosæ Caninæ*,) and is tenacious, retaining its softness for a long time, even under exposure to the air. It is a useful material for forming pill-masses, and, as it contains less tannic acid, may be used as a substitute for the conserve of red roses, when preparations of iron are to enter into the pill mass.

ROSA CENTIFOLIA.

Hundred-leaved Rose.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Polygynia.

THE PETALS.

Description.—This is an erect shrub, from three to six feet in height, and having the branches closely covered with nearly straight prickles, scarcely dilated at base, and glandular bristles of various forms and sizes; the large ones falcate. *Shoots* erect. The *leaves* consist of two or three pairs of leaflets, with an odd one at the end, closely attached to the common footstalk, which is rough, but without spines. The *leaflets* are ovate, broad, pointed, glandular-ciliate on the margin, sub-pilose beneath. The *flowers* are large, several together, drooping, on peduncles beset with short hairs, and fringed with glands. *Sepals* leafy, compound, viscid. *Petals* usually of a pale-red color. *Fruit* ovoid, and the segments of the calyx semi-pinnate.

History.—The native country of this rose-bush is unknown; but it is extensively cultivated in nearly all parts of the world, forming a valuable ornament to gardens. Its varieties are numerous, differing in form, size, color, etc. The most fragrant varieties are the best adapted for use. The parts used are the petals of the fully expanded flowers, well dried, or preserved by means of salt. They have a delicious fragrance, and a sweetish, slightly acidulous and bitter taste, with a faint astringency. Iodine is said to increase the fragrance, which depends on a volatile oil which may be separated with water. (See *Oleum Rosæ*.)

Properties and Uses.—The petals, or a syrup of them is slightly laxative; their principal use, however, is in the preparation of Rose-water, so much used in collyria and other lotions, and on account of its agreeable odor.

Off. Prep.—Aqua Rosæ; Linimentum Terebinthinæ; Lotio Ætheris Composita; Loti Sassafras; Unguentum Aquæ Rosæ.

ROSA GALLICA.

Red Rose.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Polygynia.

THE PETALS.

Description.—The *Red, French, or Provins Rose*, is a dwarfish, stiff, short-branched bush, from two to three feet high, with the *stem* and *petioles* armed with numerous fine, nearly equal, uniform prickles and glandular bristles intermixed. The *leaflets*, mostly five, are stiff, elliptical, and rugose. The *flowers* are large, erect, several together, with leafy bracts. The *sepals* are ovate, leafy, compound. The *petals* are five or more, obcordate, large, spreading, and of a rich crimson color. The *fruit* is oval, shining, and of a firm consistence.

History.—The Red Rose is a native of the south of Europe, but is cultivated in our gardens, flowering in June and July. There are many varieties, some of which are very unlike the original. With this plant, as with the previous ones, cultivation multiplies the petals very much, by the conversion of stamina. The petals are the parts used. They should be gathered before the flower has blown, deprived of their whitish claws, dried in the sun, or by a warm fire, and kept in a dry place. They retain their color when dried, and their odor becomes much improved. They have a velvety appearance, a purplish-red color, and an aromatic, bitterish, astringent, feebly acid taste; and which is communicated to water. The pale-red infusion becomes bright-red on the addition of sulphuric acid; and yields a black precipitate with the salts of sesquioxide of iron. Exposure to light and air impairs their properties, they should therefore be kept in well-closed opaque vessels. The addition of honey or sugar, preserves their properties, whether in the petals, or in infusion. They contain tannic acid, gallic acid, coloring matter, a volatile oil, a fixed oil, albumen, soluble salts of potassa, insoluble salts of lime, silica, and oxide of iron.

Properties and Uses.—Red Roses are slightly astringent and tonic. They have been used in passive hemorrhages, and excessive mucous discharges. They have also been found beneficial in bowel complaints, and are more commonly used in ophthalmic diseases, as a poultice, or the pith of sassafras and infusion of roses as a collyrium in acute ophthalmia. The infusion is also used as a vehicle for tonic and astringent medicines. The infusion, with the addition of sulphuric acid, is an agreeable refrigerant and astringent in some cases. The confection is a very common pill basis, and it is for this purpose that the article is principally employed. If iron be added to the confection, or any of its preparations, it forms a hard pill, which passes through the alimentary canal unchanged.

Off. Prep.—Confectio Rosæ.

ROSMARINUS OFFICINALIS.

Rosemary.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Diandria Monogynia.

THE TOPS.

Description.—Rosemary is an erect, perennial, evergreen shrub, three or four feet high, divided into many long, slender, ash-colored branches, and densely leafy. The *leaves* are sessile, opposite, linear, over an inch in length, and about two lines broad, entire, obtuse at the summit, revolute at the margins, of a firm consistence, smooth and green on the upper surface, whitish and downy beneath. The *flowers* are few, pale blue or white, subsessile, and disposed in short, opposite, axillary and terminal racemes. The *bracts* are shorter than the calyx. The *calyx* is purplish, campanulate and villous; the *corolla* is ringent, longer than the calyx, with the upper lip erect and bifid; the lower divided into three segments, the middle one of which is largest, concave, and emarginate. The leaves and flowers exhale a fragrant camphoraceous odor. The *stamens* are two, longer than the corolla, curved and furnished with a minute tooth near the base; the *anthers* are oblong and of a blue color. The *style* is as long as the stamens, curved and furnished with pointed stigmas. The *seeds* are four, naked and situated at the base of the calyx.

History.—Rosemary is a native of the countries surrounding the Mediterranean, and is cultivated in the gardens of Europe and this country. The flowers and leaves of the wild variety are said to be larger than those of the cultivated. The officinal parts are the flowering tops, which have a powerful, diffusive, camphoraceous odor, and an aromatic, bitter taste; they yield their properties to water or spirit, but more completely to alcohol. Age and drying impair their odor and properties, which are owing to a volatile oil, and which may be obtained by distillation. On standing for some time, the oil deposits crystals of camphor.

Properties and Uses.—Rosemary is stimulant, antispasmodic, and emmenagogue; seldom used in this country, except as a perfume for ointments, liniments, embrocations, etc. The oil is principally employed. Dose, internally, from three to six drops.

Off. Prep.—Oleum Rosmarini.

RUBIA TINCTORUM.

Madder.

Nat. Ord.—Rubiaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE ROOT.

Description.—*Dyers' Madder* has a perennial root, composed of numerous long succulent fibers, of various sizes, and united to a common head.

The *stems* are many, slender, quadrangular, jointed, decumbent, diffuse, brittle, branched and furnished at the angles with short prickles, by means of which they can climb on a support. The *leaves* are from four to six in a whorl, elliptical, acuminate, rough on edges and midrib, somewhat membranous, with pinnated veins, about three inches long, and nearly one inch broad. The *flowers* are small, yellow, and terminal, forming a ramose panicle. The *corolla* is rotate, four-cleft, with the lobes ovate-lanceolate, apiculate, and somewhat callous. The *stamens* are short; *anthers* ovate-oblong; *styles* short; and *stigmas* conical. The *fruit* is a round, shining black berry, or rather double berry, one of which is abortive.

History.—Madder is a native of the South of Europe, and is extensively cultivated in France and Holland; from which last place is derived the principal supply. The root is the part used; it is dug up in the third summer, deprived of its cuticle, dried by artificial heat, and then reduced to a coarse powder, which is of a brownish-red color. The root consists of a thin epidermis, covering an easily separable cortex, and a ligneous medullium, which is at first yellow, but on drying becomes reddish. The plant is cultivated in the State of Ohio. Madder has a weak peculiar odor, a bitterish, astringent taste, and imparts its color and properties to water or alcohol. According to analysis, madder contains sugar, resin, and five coloring matters, and according to Runge, *Madderic* and *Rubiatic* acids. The coloring substances are a red, a purple, an orange, a yellow, and a brown. One of these, *Xanthin*, has been noticed by Kuhlmann, and two others *Purpurin* and *Alizarin*, by Robiquet and Colin. The coloring matters are probably all modifications of a single substance, which appears to be the *Xanthin*, as at first the juice of the root is yellow, and does not become red only under exposure to the atmospheric oxygen. The *alizarin* is the most interesting of the coloring substances. It is of an orange-red color, inodorous, tasteless, crystallizable, sublimes without change, hardly soluble in cold water, but soluble in boiling, readily soluble in alcohol, ether, fixed oils, and alkaline solutions. The alcoholic and watery solutions are rose-colored; the ethereal, golden yellow; the alkaline, violet and blue when concentrated, but violet-red when sufficiently diluted. A precipitation of a mixture of the solutions of alum and alizarin, affords a beautiful rose-colored lake. When taken into the stomach, the coloring matter of madder is absorbed, and the urine, milk, and bones become colored red, though none of the other tissues are affected by it.

Properties and Uses.—Madder is supposed to be emmenagogue and diuretic, and has been recommended for such purposes by various practitioners. However, it is not in general use, as the profession lack confidence in its action. The dose is thirty grains, three or four times a day.

RUBUS STRIGOSUS.

Red Raspberry.

RUBUS TRIVIALIS.

Dewberry or Low Blackberry.

RUBUS VILLOSUS.

Blackberry.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Polygynia.

THE BARK OF THE ROOT, AND RASPBERRY LEAVES.

Description.—RUBUS STRIGOSUS is a shrubby, strongly hispid plant, about four feet in height. The *leaves* are pinnately three or five-foliate, with the *leaflets* oblong-ovate or oval, obtuse at base, pointed, coarsely and unequally serrate, green above, canescent tomentose beneath, lateral ones sessile, odd one often subcordate at base, and distinctly petiolulate; they are from one and a half to two and a half inches long, and about from one-third to two-thirds as wide. The *flowers* are white, and in panicked corymbs. The *corolla* is cup-shaped, and about the length of the calyx. The *fruit* is a red berry, hemispherical, composed of many juicy, one-seeded acini, on a dry receptacle, of a rich delicious flavor.

RUBUS TRIVIALIS or Rubus Canadensis, sometimes called *Low* or *Creeping Blackberry*, has a slender, prickly *stem*, which runs along the ground for several yards. The *leaves* are petiolate and composed of three, (or pedately five or seven) *leaflets*, which are elliptical, or rhomboidal-oval, acute, thin, membranaceous, sharply and unequally cut-serrate, often somewhat incised, somewhat pubescent, from an inch to an inch and a half long, and about one-half as wide. The common *petioles* are one or two inches long, and together with the *peduncles*, are armed with recurved, hispid prickles; sometimes naked. The *stipules* are linear, subulate, entire, or serrate. The *flowers* are large, white, nearly solitary, on slender, elongated, prickly, somewhat corymbed pedicels, with leafy bracts; the lower peduncles distant, the upper crowded. The *petals* are obovate, in one variety orbicular, and twice as long as the calyx. *Fruit* large, black, very sweet and juicy.

RUBUS VILLOSUS, is a pubescent, viscid and prickly shrub, with a horizontal, perennial, irregularly tuberous, woody root, of a reddish-brown color, from which arise tall, slender, angular, and biennial *stems* from three to seven feet high, of a brownish color, branching, recurved at top, more or less furrowed, and armed with strong, curved prickles. The smaller branches and new shoots are decumbent, herbaceous, greenish, pubescent and prickly. The *leaves* are ternate or quinate, and are composed of from three to five *leaflets*, which are ovate, acuminate,

sharply and unequally serrate, and pubescent on both sides; the *petioles* and *midrib* usually armed with short recurved prickles. The *flowers* are large, white, and in erect terminal panicles or racemes; the *calyx* is short, with acuminate segments; the *petals* are five, obovate or oblong, obtuse; *stamens* numerous; *filaments* slender; *anthers* small. The *fruit* is large, at first green, then red, and when matured, black, it consists of about twenty roundish, shining, black, fleshy *carpels*, closely collected into an ovate or oblong head, subacid, well-flavored, and ripening in August and September.

History.—The *Red-raspberry* grows wild, and is common to Canada and the Northern United States, growing in hedges, neglected fields, thickets and hills, flowering in May, and ripening its fruit from June to August. The leaves are the officinal parts. They impart their properties to water, giving to the infusion an odor and flavor somewhat similar to that of some kinds of black tea.

The *Dewberry* likewise grows wild in dry, stony fields, gravelly soil, and neglected grounds, and is common from Canada to Virginia, flowering in May, and ripening its fruit in July and August. The root is the officinal part, it is generally smaller than the blackberry root, with transverse fissures through the epidermis, but no longitudinal wrinkles, of a dark-ash color, without any reddish tinge, inodorous, with a bitterish, strongly astringent taste. *Blackberry* grows abundantly in most parts of the United States, in neglected fields, along fences, on the borders of woods, etc. Its flowers appear from May to July, and its fruit is matured in August. The *root* is the officinal portion, it is branching, cylindrical, of various dimensions, from an inch down to two or three lines in diameter, ligneous, covered with a thin light brown or reddish brown bark, which when dried is wrinkled longitudinally.

These plants possess similar medicinal properties, and may be substituted the one for the other; and as they belong to the same genus, I have placed them together. The bark of the old roots, or the smaller roots, of dewberry and blackberry, should always be selected for use, as the woody portion is inert; their odor and taste are similar, and they impart their virtues to boiling water, or diluted alcohol. They contain a large quantity of tannic acid, with bitter extractive; no accurate analysis has been made of them. The *fruits* of these plants are much esteemed as an article of diet, and have been manufactured into cordial, jam, jelly, and syrup. They contain volatile oil, citric and malic acids, sugar, mucus, etc.

Properties and Uses.—These plants are tonic and strongly astringent. An infusion or decoction of the leaves of raspberry, or of the bark of the roots of the other two, has been found an excellent remedy in diarrhea, dysentery, cholera-infantum, relaxed conditions of the intestines of children, passive hemorrhage from the stomach, bowels, or uterus, and

in colliquative diarrhea. The decoction used as an injection, is useful in gonorrhea, gleet, leucorrhea, and prolapsus uteri and ani; in prolapsus uteri, it may be used either alone or combined with the internal use of a decoction of equal parts of black cohosh and blackberry roots, taken freely. The leaves of raspberry, in decoction with cream, will allay nausea and vomiting, and combined with aromatics has been found useful in diarrhea, cholera-morbus and cholera-infantum. It is said that the raspberry exerts an influence over the uterus during parturition, exciting its contractions when other agents have failed, and has been found serviceable in after-pains. The *fruit*, especially that of the blackberry, makes an excellent syrup, which is of much service in dysentery, being grateful to the patient, relieving the tenesmus which so constantly attends the disease, and ultimately effecting a cure. The fruit of the raspberry contains very little nourishment, but is an agreeable acidulous article, rarely disturbing the stomach, and when eaten freely, promotes the action of the bowels. Raspberry syrup added to water, forms a refreshing and beneficial beverage for fever-patients, and during convalescence. The jelly or jam may likewise be used in similar cases; that of the blackberries being more astringent, is better adapted to cases of diarrhea, dysentery, and cholera-infantum. Dose of the decoction of these plants, from one to four fluidounces several times a day; of the pulverized root-bark from twenty to thirty grains.

The *Rubus Odoratus*, or *Rose-flowering Raspberry*, has an erect or reclining, unarmed, glandular-pilose, shrubby *stem*, from three to five feet in height. The *leaves* are from four to eight inches long, nearly as wide, cordate at base, palmately three to five-lobed, unequally serrate, *lobes* acuminate, the middle one prolonged, *petioles* two or three inches long, and with the peduncles, calyx and branches, clothed with viscid hairs. *Flowers* many, large, nearly two inches in diameter, in terminal corymbs. *Petals* orbicular, purple-rose color; *stamens* numerous, whitish. *Fruit* broad and thin, bright-red, sweet. This plant grows on rocky banks, and in upland woods in the United States and Canada, flowering in June and July, and ripening its fruit in August. A decoction of it is said to be powerfully diuretic, and may be used freely in affections of the urinary organs, and dropsy.

RUDBECKIA LACINIATA.

Thimbleweed.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Frustranea.

THE WHOLE PLANT.

Description.—This plant, also known by the names of *Cone-disk Sun-flower*, and *Tall Cone-flower*, is a tall, showy, indigenous, perennial plant, with a round, glabrous, branching *stem*, from three to eight feet in height.

The *leaves* are alternate, smooth or roughish, the lower ones pinnate with from five to seven cut or three-lobed leaflets, petiolate, the upper ones irregularly three to five-parted; the lobes ovate-lanceolate, pointed. The *flowers* are large, and terminal; *pappus* crenate; *chaff* truncate and downy at the tip. *Rays* one or two inches long, oblanceolate, bright yellow, spreading or drooping. *Disk* oblong-conical, and columnar in fruit, greenish-yellow.

History.—This plant grows in various parts of the United States, in damp places, low thickets, edges of swamps and ditches, etc., flowering from July to September. The whole herb is recommended to be used. Its chemical reactions, as well as formation, are not known. It imparts its properties to water.

Properties and Uses.—Thimbleweed is a valuable diuretic, tonic and balsamic. Useful in many diseases of the urinary organs, and highly recommended in strangury, Bright's disease, and wasting or atrophy of the kidneys. Dose of the decoction, *ad libitum*.

The *RUDBECKIA PURPUREA* of Linnæus, variously called *Red Sun-flower*, *Comb-flower*, or *Purple Cone-flower* (the *Echinacea Purpurea* of Mœnchausen), has a thick, black *root*, with branched, sulcate, smooth or rough *stems*, growing from three to five feet in height. The *leaves* are alternate, from four to eight inches long, and about one-fifth as wide, rough, with short stiff bristles; the lower ones broad-ovate, attenuate at base, five-nerved, veiny, long-petioled, remotely-toothed; the cauline ones lanceolate-ovate, acuminate, nearly entire. *Heads* large, solitary, on long peduncles. *Disk* thickly beset with the stiff, pointed, brown *chaff*. *Rays* from fifteen to twenty, two or three inches long, dull purple, pendulous, bifid. This plant is common to the Western prairies and banks, and is found also in the Southern States flowering from July to September. The root is very pungent to the taste, and has been popularly used in medicine under the name of *Black Sampson*; it is stated to have been employed with much benefit in syphilis. Both of the above plants, deserve a full and thorough investigation from the profession. From all I have been able to learn, the latter plant is equal to the *Stillingia* in medicinal efficacy.

RUMEX ACETOSA.

Sorrel.

Nat. Ord.—Polygonaceæ. *Sex. Syst.*—Hexandria Trigynia.

THE LEAVES.

Description.—*Rumex Acetosa* has a long and tapering, somewhat woody *root*, with an erect, simple, leafy, striated *stem*, one or two feet high. The *lower leaves* are petiolate, somewhat ovate, arrow-shaped, with two lateral teeth; the *upper ones* are sessile, more oblong and narrower. *Stipule* tubular, membranous, fringed. *Clusters* erect,

compound, whorled, leafless. *Flowers* dicecious. *Males* green with a reddish tinge; inner *sepals* ovate, rather larger than the outer. *Females* rather redder; inner *sepals* ovate, obtuse, red, entire, each bearing an oblong pale tubercle. The whole herb is smooth and powerfully and agreeably acid. The root is astringent. The plant is common to England, and is sometimes cultivated in this country.

RUMEX ACETOSELLA, *Field or Sheep Sorrel*, has a leafy *stem* from six to twelve inches in height, with lanceolate-hastate, pleasantly acid *leaves*. The *flowers* small, reddish, collected in paniced racemes, the *valves* are ovate scarcely enlarging in fruit, destitute of granules. The *stamens* and *styles* on separate plants; the *styles* adherent to the angles of the ovary. This weed is found in abundance throughout the United States, growing in pastures, waste grounds, and worn fields, and flowering all summer.

History.—The leaves of these two plants are the parts used in medicine; they are inodorous, and have an agreeable sourness, which latter depends on the presence of binoxalate of potassa, with a small proportion of tartaric acid; by drying them this taste is lost. They are used alone, or in an infusion of the fresh leaves.

Properties and Uses.—Fresh Sorrel leaves are refrigerant and diuretic; an infusion is useful in febrile and inflammatory diseases, and in scorbutic complaints. They may likewise be prepared in the form of salad, or boiled like spinage. The leaves eaten largely are said to have produced poisonous effects, owing to the oxalic acid they contain. Wrapped up and roasted, the leaves form an excellent application to indolent tumors, wens, boils, etc., hastening suppuration. The inspissated juice, applied on leather, is said to form an effectual but painful cure for tumors and incipient cancers. Acting upon this hint, the following preparation has been found a useful remedy in cutaneous cancer, viz: Take of Burnt Alum, one drachm; Citric or Tartaric Acid, two drachms; Oxalic Acid, two drachms; Rain Water, half a pint. Mix. To be applied by means of a camel's hair pencil.

RUMEX AQUATICUS.

Great Water Dock.

RUMEX BRITANNICA.

Water Dock.

RUMEX OBTUSIFOLIUS.

Blunt Leaved Dock.

RUMEX CRISPUS.

Yellow Dock.

Nat. Ord.—Polygonaceæ. *Sex. Syst.*—Hexandria Trigynia.

THE ROOT.

Description.—*Rumex Aquaticus* has a large thick *root*, externally black, internally whitish, with an erect *stem* from three to five feet high;

the *leaves* are a foot or more in length, and three to five inches wide, smooth, lanceolate, pointed, the lower ones cordate, on long petioles. The *flowers* are verticillate, and are disposed in a terminal leafy panicle. *Pedicels* capillary, drooping. The three *petals*, or as termed by some botanists, the three inner divisions of the calyx, approach each other, so as to assume a triangular shape, and in this state are called *valves*; these are large, ovate, obtuse, entire, and are each furnished with a small, linear, often obscure grain, extending down the middle. The plant is a native of Europe, but naturalized in America. It grows in this country in ponds and ditches, and flowers in July and August.

RUMEX BRITANNICA, or *Yellow-rooted Water Dock*, has a large *root*, externally dark, internally yellowish, with an angular, furrowed, branching *stem*, two or three feet high. The *leaves* are broad-lanceolate, acute at both ends, from three to five inches long, petiolate, flat, smooth, with the sheathing stipules slightly torn. The *flowers* are perfect, in verticillate fascicles, collected into a large, terminal panicle, the spikes of which are nearly leafless. The *pedicels* are capillary and nodding in fruit. The *calyx valves* large, cordate, entire, graniferous, two of the grains small or abortive. This plant is indigenous, growing in low, wet places, in various parts of the United States, and flowering in June and July.

RUMEX OBTUSIFOLIUS, or *Blunt Leaved Dock*, has its *root* brown externally, and yellow internally; the *stem* is two or three feet high, furrowed, somewhat roughish, branching, and leafy. The *radical leaves* are about a foot long, and five or six inches in width, ovate-cordate, obtuse, rather downy on the veins underneath, somewhat wavy margined, often with stalk and veins red; the upper ones are oblong-lanceolate, and acute. The *flowers* are in long, nearly naked racemes; *whorls* loose and distant; *valves* ovate-halbert shaped, sharply denticulate at the base, strongly reticulated, one of them principally bearing a granule on the back. This is a common weed, growing in rich grounds and pastures, and about houses, flowering in June and July. It is supposed to have been introduced from Europe.

RUMEX CRISPUS, or *Yellow Dock*, is the species of Dock more commonly used by Eclectics, and is, perhaps, the only one entitled to an official rank in our Dispensatory. It has a deep spindle-shaped, yellow *root*, with a *stem* two or three feet high, angular, furrowed, somewhat zigzag, smooth to the touch, panicked, leafy. The *leaves* are lanceolate, acute, strongly undulated, and crisped at the edges, of a light-green color; the radical ones on long petioles, truncate, or subcordate at base; the uppermost narrower, and nearly sessile. The *flowers* are numerous, pale-green, drooping, disposed in a large panicle consisting of many wand-like racemes of half-whorls, interspersed with leaves below. *Inner sepals*, or *valves*, much larger than the outer, veiny, waved, entire, ovate, each bearing a large ovate brown grain or tubercle on the back.

Nut contracted at each end, with three blunt or tumid angles. This plant is a native of Europe, introduced into this country, where it grows wild in pastures, dry fields, waste grounds, etc., flowering in June and July.

History.—I have placed these four species of dock together, in consequence of their possessing similar medicinal properties, and which under separate heads would lead to an unnecessary repetition. The roots of several other species have been medicinally employed, and may be used indiscriminately with the above, as the *R. Patientia* and *R. Alpinus* of Europe, and the *R. Acutus* and *R. Sanguineus* of this country. These various dock-roots have little or no odor, a bitter astringent taste, and readily yield their virtues to water by decoction. They have not all been analyzed. The *R. Obtusifolius* contains a peculiar principle called *Rumicin*, resin, extractive matter resembling tannic acid, starch, albumen, mucilage, lignin, sulphur, and various salts. The young leaves of some of the species are occasionally used as spinage. As found in the shops, yellow dock-root is in slices cut transversely and dried, and occasionally the root is divided longitudinally into halves or quarters; it is sometimes called *Sour Dock*, *Narrow Dock*, or *Curled Dock*.

Properties and Uses.—The dock-roots are alterative, tonic, mildly astringent, and detergent, and are eminently useful in scorbutic, cutaneous, scrofulous, scirrhus, and syphilitic affections, leprosy, elephantiasis, etc.; for which purpose we prefer the *Rumex Crispus*. The fresh root bruised in cream, lard, or fresh butter, forms an excellent ointment for scrofulous ulcers, scrofulous ophthalmia, itch, and a discutient for indolent glandular tumors. An ointment of the root of *R. Crispus*, and the root-bark of *Celastrus Scandens*, with gunpowder, is said to form a certain cure for the itch, as well as being of value in other cutaneous diseases, and ulcers. The powdered root is recommended as a dentifrice, especially when the gums are spongy. Dose of the decoction or syrup, from one to four fluidounces, three times a day.

Off. Prep.—Decoctum Rumecis; Extractum Rumecis Hydro-alcoholicum; Syrupus Rumecis Compositus.

RUTA GRAVEOLENS.

Rue.

Nat. Ord.—Rutaceæ. *Sex. Syst.*—Decandria Monogynia.

LEAVES AND UNRIPE FRUIT.

Description.—Rue is a perennial plant, with shrubby branching stems, two or three feet in height, woody at the lower part and covered with a rough, gray bark, but smooth, green, and herbaceous in the upper part and branches. The leaves are alternate, smooth, glaucous, a little tomentose, transparently dotted, and doubly pinnate; the leaflets are

sessile, unequal, obscurely crenate, somewhat thick and fleshy; the lateral lobes linear or nearly so; and the terminal ones larger and obovate. The *flowers* are of a pale greenish-yellow color, and disposed in terminal corymbose panicles, upon subdividing peduncles; the terminal, or first unfolded, only having the full number of the parts of fructification; the others having eight stamens and four sepals and petals. The *petals* are large, rounded a little, toothed at the extremity, and concave, attached by narrow claws. The *stamens* are equal, with small yellow anthers. The *ovary* is oval, with crucial furrows, and is surmounted by a short style. The *capsule* is gibbous, four-lobed, and bursts at the summit of each lobe, for the passage of numerous, angular, blackish seeds. The process of impregnation is singular, each anther in turn approaching the style, and after shedding its pollen, retiring.

History. — Rue is a well known, hardy, evergreen undershrub, a native of the south of Europe and north of Africa, and cultivated in our gardens, flowering from June to September. The whole plant has a strong, peculiar, disagreeable odor. The whole herbaceous portion of it possesses medicinal activity, but the leaves are more generally employed. They have a strong, disagreeable odor, and a disagreeable, bitter, acrid taste. In the recent state they will inflame and vesicate the skin. They should be gathered when the seed vessels are well-developed, yet still green; the seed-vessels of the unripe fruit are covered with large oil vesicles, and may likewise be used for medical purposes. The virtues of this plant are owing to a volatile oil, which is abundantly contained in glandular vesicles, with which it is covered, and which may be obtained by distillation with water. It yields its properties to boiling water in infusion, but alcohol is its best solvent. The plant loses much of its activity by drying. Beside volatile oil, the plant is said to contain albumen, chlorophylle, extractive, gum, starch or inulin, an azotized matter, malic acid, lignin, and a peculiar acid called *Rutinic acid*.

Properties and Uses. — Rue is emmenagogue, ecboic, anthelmintic and antispasmodic. In large doses it acts as a narcotico-acrid poison. It has been taken by pregnant women, and produced dangerous symptoms of gastro-intestinal inflammation, and cerebral derangement, terminating in miscarriage. Its action is chiefly directed upon the uterus, and is capable of exciting menorrhagia, inflammation, and miscarriage. It has been successfully used in flatulent colic, hysteria, some nervous complaints, epilepsy, and as an excellent vermifuge. Dose of the leaves, from ten to twenty grains; of the decoction, from one to four fluidounces; of the oil, from two to six drops.

Off. Prep.—Infusum Rutæ; Oleum Rutæ.

SABBATIA ANGULARIS.

American Centaury.

Nat. Ord.—Gentianaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE HERB.

Description.—This plant, also called *Rose-pink*, has a yellow, fibrous, biennial *root*, with an erect, smooth, quadrangular *stem*, with the angles winged, having many opposite *branches*, and growing from one to two feet in height. The *leaves* are opposite, sessile, ovate, cordate at base, clasping the stem, five-veined, smooth, entire, and from one to two inches in length by half an inch to one and a half inches in width. The *flowers* are numerous, from an inch and a quarter to an inch and a half in diameter, of a rich rose color, terminal, on elongated peduncles, greenish or whitish in the center, and forming a large corymbose panicle. The *calyx* with five narrow, lanceolate, almost subulate segments, about half the length of the corolla; *tube* angular. *Corolla* with five obovate segments. *Stamens* five, erect, with short slender filaments and oblong anthers of a yellow color, which are spirally twisted after fecundation. The *ovary* is ovate, with a terete, declined, and bifid *style*, and the stigmas twisted spirally together. *Capsule*, one-celled, two-valved, many-seeded.

History.—This plant is common to the Middle and Southern States, growing in low meadow grounds, and in wet seasons upon uplands, in woods and neglected fields, and flowering in July and August. The herb is employed, and should be collected when in flower. It has a strong bitter taste, and yields its virtues to water or alcohol. It is preferable to the European Centaury.

Properties and Uses.—Tonic. Used as a prophylactic and remedy in autumnal intermittent and remittent fevers; also useful in dyspepsia, and convalescence from fevers. When administered in warm infusion it is a domestic remedy for worms, and to restore the menstrual secretion. Dose of the powder from half a drachm to a drachm; of the cold infusion four fluidounces every two or three hours; of the tincture one or two fluidrachms; and of the extract from two to six grains.

Off. Prep.—Infusum Sabbatiæ.

SACCHARUM OFFICINARUM.

Sugarcane.

Nat. Ord.—Graminaceæ. *Sex. Syst.*—Triandria Digynia.

THE SUGAR, OR CONCRETE JUICE.

Description.—Sugarcane is a herbaceous plant, with a jointed, succulent *root*, from which arise several shining, jointed, solid *stems*, one or two inches in diameter, from six to twelve feet in height, colored yellow,

greenish-yellow, purple, or striped, and containing a white juicy pith. The *leaves* are about three or four feet long, and an inch wide, flat, acuminate, longitudinally striated, furnished with a white midrib, glabrous, finely dentate, of a yellowish-green color, and originating at the joints of the stems which are about three inches apart, and at which places the stem is embraced by their lower portion. The *panicle* is terminal, spreading, erect, oblong, from one to three feet in length, and grayish from the quantity of long loose hairs surrounding the florets; the *branches* are alternate and very spreading. *Rachis* striated. *Florets* diœcious, in pairs. *Glumes* smooth. *Paleæ* smooth, membranous, of a pink color.

History.—The native country of sugarcane is unknown, though supposed to be indigenous to the south-eastern parts of Asia. Those canes which have not flowered, or have no tendency to flower, are the richest in sugar; and the lower part of them contains the greatest proportion. The juice constitutes nearly one-half of the cane, and when expressed, ferments rapidly, forming an acid, so that it requires to be promptly evaporated, and its acidity neutralized, before the sugar can be made. It has been analyzed a number of times, and is found to consist of crystallizable and uncrystallizable sugar, water, malic acid, gum, extractive, chlorophylle, etc. The sugar and molasses of commerce are obtained from the juice of this plant, and are prepared as follows: the ripe canes are cut down close to the ground, and with their tops and leaves removed, are crushed between vertical iron rollers. The juice thus obtained, constituting from fifty to ninety per cent., is of a pale-greenish color, sweet, with a balsamic odor, and a specific gravity from 1.033 to 1.106. The juice ferments quickly, and is therefore, at once conveyed from the vessels which have received it, into boilers, where every eight hundred parts of it are immediately mixed with about one part of milk of lime, or sufficient to render the liquor neutral, or very slightly alkaline, and heated to 140°. A thick scum forms on the top, consisting of albumen and gluten, and the liquid beneath is drawn off by means of a cock into a copper boiler, where it is sufficiently concentrated by ebullition, the scum being removed as it forms. If the juice be filtered, previous to the last boiling, it improves the sugar. When of the proper consistence, the concentrated juice is removed to shallow coolers, and again conveyed, before cooling, into wooden vessels having perforated bottoms, with the holes temporarily plugged. As the sugar concretes, the liquid is stirred from time to time, which accelerates its granulation. When completed, the stoppers are removed from the holes, and the syrup is allowed to drain off. A yellowish, moist sugar is the result, which is further dried in the sun, and constitutes the *brown sugar* of commerce; the liquid which is left, is again concentrated, and a further supply of sugar obtained, as well as of drainings, and which last is *molasses*. The brown sugar is formed into *Havanna sugar* by being again boiled with

lime-water, sufficiently concentrated, placed in large inverted conical vessels, and, when sufficiently solid, covered with a thin mixture of clay and water, the latter of which percolates through the sugar, and removes the colored syrup through a small opening in the bottom of the vessel, rendering it of a whitish color. The sugar is still further purified by again boiling, filtering, clarifying, and placing it into molds, where it is again clayed, and when all the syrup is removed, the sugar is placed in a warm oven to dry, and constitutes *white* or *refined sugar*. And by one or more repetitions of the process, is obtained *single*, *double*, and *treble refined sugar*. In clarifying the sugar, it is at first, while in the form of syrup, heated with bullock's blood, and then decolorized by passing it through a layer of coarse-grained animal charcoal, two or three inches thick. In the process of manufacturing sugar, a large proportion of it is lost, to prevent which several plans have been offered, but which have not, as yet, received sufficient confidence to induce sugar-manufacturers to adopt them.

Beside the sugarcane, sugar may be obtained from the beet, (*Beta Vulgaris*), and the sap of the sugar-maple, (*Acer Saccharinum*) and likewise from corn-stalks, turneps, onions, etc. In France considerable quantities are manufactured from the beet; and in Canada and the United States, wherever the sugar-maple tree grows abundantly, *maple sugar*, as it is termed, is largely made. A large quantity of sugar is also obtained from the sap of the cocoa-nut tree, (*Cocos Nucifera*) as well as other species of palm growing in India.

Other saccharine principles are recognized by the chemist, as *Glucose*, or *Grape-sugar*; this is not so sweet as canesugar, nor so readily soluble in water, but is much more soluble in alcohol. The crystallizable sugar of honey, starch sugar, and diabetic sugar are identical with it. It is hardly acted upon by concentrated mineral acids, which destroy canesugar with facility; alkalis, which form definite compounds with canesugar, destroy grape-sugar. It undergoes very little change by long boiling with water, which is apt to decompose cane-sugar, causing a loss in the amount of sugar obtained. Its solution rotates the plane of polarization of polarized light to the right, and is capable of undergoing the vinous fermentation immediately, without passing through any intermediate state. Its specific gravity is 1.386, and its formula $C_{12}H_{14}O_{11}$.

Uncrystallizable or *Fruit-sugar*, called by Souberain, *Chulariose*. This is found in honey, and in the juice of fruits, and may be obtained from cane-sugar by solution in water or weak acids, and long boiling. A watery solution of this sugar turns the plane of polarization to the left, and is as susceptible of the vinous fermentation, without intermediate change, as the grape-sugar. Its formula, when dried at 212° , is $C_{12}H_{12}O_{12}$. *Lactin* or *Sugar of Milk*, see *Saccharum Lactis*. *Sugar of Ergot*, obtained by Wiggers from ergot of rye, is soluble in water and alcohol, crystallizes in transparent rhombic prisms, and is susceptible of the

vinous fermentation. Its formula is given as $C_{12}H_{22}O_{11}$. For a description of the other saccharine principles, *mannite* and *glycerin*, see articles Manna and Glycerina.

Sugar has been known from the earliest ages, and was used in Europe exclusively as a medicine, from the time of its introduction, about the period of the Crusades, until the cultivation of the sugar-cane in the New World, when it soon became a common article of food throughout the civilized world. The greater part of the sugar of commerce at this day, is manufactured in the West Indies, and some of the Southern United States. In the United States, a variety of sugar-cane, called the Otaheite-cane, has recently been introduced; it is said to be hardier, more productive, and better suited to the climate of the Southern States.

The first concretion of the juice of sugar-cane, as before remarked, gives rise to brownish crystalline grains, and a thick, empyreumatic syrup, called molasses, *Sacchari Fæx*, or *Sacchari Syrupus Empyreumaticus*. Of this, there are two varieties, the West India and Sugar-House. The *West India Molasses* is a black ropy liquid, of a peculiar odor, and a sweet empyreumatic taste. When mixed with water and the skimmings of the vessels used in the manufacture of sugar, it forms a liquor, which, when fermented and distilled, yields rum. *Sugar-house Molasses* is the officinal one, it is thicker than the West India, about the same color, with a peculiar, sweet, rather pleasant taste, differing in flavor from the former; it consists chiefly of gummy extract and uncrySTALLIZABLE sugar, and thickens very slowly under exposure to the air. Its specific gravity is 1400.

The grains constitute the brown sugar, raw sugar, or muscovado sugar of commerce, *Saccharum Commune*, (*Saccharum non Purificatum*); six or eight pounds of the juice yield one pound of raw sugar, and this when purified is the refined loaf, or white sugar, *Saccharum Purum*. *Raw sugar*, of good quality, is in small shining grains, which are short, broken, four-sided prisms varying in color from very pale yellowish-gray, to rather deep yellowish-brown, dry when recent, but afterward somewhat clammy, of a purely sweet taste, and of a feeble honey-like odor.

Pure Sugar is usually prepared in compact, crystalline, conical loaves, which are snow-white, dry, easily pulverizable, inodorous, of an intense sweet taste, without any aroma, permanent in the air, phosphorescent by friction, and of a specific gravity from 1.5629 to 1.6. It crystallizes in oblique, four-sided prisms, terminated by two converging planes, or in derived figures, in which form it contains 5.3 per cent. of water of crystallization. When heated to 365° , it melts into a viscid, colorless liquid, which on being suddenly cooled, forms a transparent amorphous mass, called *Barley-sugar*; between 400° and 420° , it loses two equivalents of water, swells, emits a peculiar odor, and is converted into a black porous mass, having a high luster, like anthracite, called

Caramel. At a still higher temperature, it yields combustible gases, carbonic acid, empyreumatic oil, and acetic acid, leaving about one-fourth its weight of charcoal, which burns without residue. Sugar is soluble in twelve parts of rectified spirit and in eighty parts of alcohol; it dissolves readily in half of its weight of temperate water, and to an almost unlimited extent in boiling water, which solution, when thick and ropy, is called Simple Syrup, *Syrupus Simplex*. The fixed and volatile oils are to a certain extent rendered miscible with water by means of sugar, with the volatile oils it imperfectly combines, forming the *Oleum-saccharum* of the pharmacist. Sugar may be distinguished from most other organic principles, by not being precipitated by subacetate of lead, when in solution. Strong nitric acid, with the aid of heat, converts sugar into oxalic acid; and when weak, into saccharic acid. Chlorine converts it into saccharic acid. Concentrated sulphuric or muriatic acid chars it; diluted muriatic acid, converts it into a solid, brown, gelatinous mass, by boiling. Diluted sulphuric acid changes it into uncrystallizable sugar, then into grape sugar, and ultimately into sacchulmin, which is insoluble, and sacchulmic acid, which is soluble in ammonia. Sugar in fine powder, treated with a mixture of sixteen parts of sulphuric and eight of nitric acid, and cooled to the temperature of 60°, is converted, in a few seconds, into a pasty substance, which, after having being washed in cold water and dissolved in alcohol, furnishes, on the addition of an excess of carbonate of potassa to the alcoholic solution, a peculiar explosive and inflammable substance, resembling common rosin in its physical properties, and, like it, insoluble in water, but soluble in alcohol, ether, and the volatile oils. Oxalic, tartaric, citric, malic, and acetic acids, prevent sugar from crystallizing from its watery solution, effecting changes in it similar to those resulting from the action of mineral acids. If sugar be boiled in open vessels with weak sulphuric acid, for several days, oxygen will be absorbed, and *formic acid* will be generated with sacchulmin and sacchulmic acid. Sugar combines with the alkalies, losing its sweet taste, and forming compounds which render the sugar less liable to change; it likewise unites with various metallic oxides rendering them soluble. Boiled for a long time with aqueous solutions of potassa, lime, or baryta, the liquid becomes brown, formic acid is produced, and melassic and glucic acids are generated; the former being brown or black, and insoluble in water, the latter colorless and very soluble. When distilled with lime, sugar yields a volatile liquid called acetone, and an oily substance termed *Metacetone*.

Properties and Uses.—Sugar is nutritive, alterative, demulcent, and topically antiseptic. It cannot sustain life alone, owing to the absence of nitrogen in its composition, and only becomes eminently nutritive when combined with other alimentary proximate principles. Used in large quantities it is injurious to digestion. In relation to both vegetable and animal matters it is a powerful antiseptic; the former of which may be

preserved indefinitely in syrup, so long as the syrup is secured against fermentation; while the latter, after long immersion in syrup, or in moistened sugar, may be perfectly mummified. On this account it is now used considerably in preserving fish and meat, instead of salt, to which it is superior, as it requires a less quantity of sugar than salt, and does not change the taste nor injure the nutritive qualities of the aliment. Sugar or molasses, when freely eaten by children, prove excellent anthelmintics; it has proved beneficial in scurvy, and in some chronic cutaneous diseases, and powdered loaf sugar has been applied externally to fungous ulcers, and for the removal of specks on the cornea. It has long been a popular idea that sugar is injurious to the teeth, this, however, is erroneous; if particles of sugar become lodged between the teeth, and are allowed to decompose, decay will inevitably ensue, but if the particles be removed at an early period, sugar will be found to exert a beneficial influence upon the teeth and gums. As a demulcent, sugar has been used in various forms in catarrhal affections; and when it is used daily in very large quantities, say a pound or more dissolved in a quart of cold water, it is said to be powerfully antiphrodisiac. The use of it, however, is mainly confined to the preparation of syrups, to cover the taste of nauseous drugs, for rendering oils miscible with water, for suspending many drugs in the form of mixture or emulsion, to protect certain ferruginous preparations from oxidation, and also for converting some agents into the state of conserve, confection, electuary, pill, or lozenge. For pills, molasses is most generally preferable to syrup, as it does not so readily harden, and preserves them in a soft, moist state, for a long time, while its antiseptic properties prevent them from becoming moldy.

Sugar may be detected in urine by the liquid fermenting on the addition of yeast; or by yielding a reddish-brown precipitate when boiled with a solution of sulphate of copper, and solution of caustic potassa; boiled with solution of potassa alone, it acquires a dark-brown or bistre tint. Dr. Donaldson gives the following simple and easy method for discovering the presence of sugar in the blood, urine, or bile: Take of crystallized carbonate of soda, and caustic potassa, of each, five parts, bitartrate of potassa six parts, crystallized sulphate of copper four parts, distilled water thirty-two parts; mix together, boil, and filter. A few drops of this solution, thrown into urine or other liquid suspected of being saccharine, and heated over a spirit-lamp, will discover the smallest quantity of sugar present. After a few minutes' application of heat, the liquid acquires first a yellowish-green color, and becomes more and more reddish-yellow, as the proportion of sugar is more considerable. Sugar in solution absorbs a very large quantity of lime. A *saccharate of lime* has been found very beneficial in the chronic diarrheas of children, as well as to prevent acidity of the stomach, and the disposition to diarrhea so common in children of a certain age at particular seasons.

It is made by saturating simple syrup with lime, and then filtering it; it forms a transparent mixture of an extremely alkaline taste, and may be added to water or milk. It is altogether superior to the bicarbonate of soda. Dose for an infant, from a fourth to half a drachm, given in some of the mother's milk; for an adult, from one drachm to two and a half.

Off. Prep. of Saccharum Purum.—Syrupus.

Off. Prep. of Saccharum Commune.—Confectio Sennæ.

SACCHARUM LACTIS.

Sugar of Milk. Lactin.

Preparation.—Evaporate whey to the consistence of syrup; when cool, clarify it by white of eggs, strain, and carefully evaporate by a gentle heat, that it may crystallize on cooling. For further purification, use animal charcoal, and repeated crystallizations.

History.—Sugar of Milk is a white, gritty, crystalline, semi-transparent substance, permanent in the air, soluble in five or six parts of cold water, and two and a half or three of boiling water, without forming a syrup, and insoluble in alcohol or ether. It is inodorous, feebly sweet, but much more so in a concentrated solution, and of the specific gravity 1.54. It is frequently met with in cylindrical masses, in the axis of which is a cord, around which the crystals have been deposited. When converted into grape-sugar by the action of diluted acids, it is susceptible of vinous fermentation, and affords an intoxicating spirituous liquor. Mucic acid is formed by the action of diluted nitric acid upon it. Its formula is $C_{24} H_{19} O_{19} + 5HO$; and when anhydrous $C_{24} H_{19} O_{19}$.

Properties and Uses.—Its principal medicinal use is in the trituration of drugs; to aid in rendering them finer and more energetic, as well as to assist in more easily dividing active agents which are to be given in minute doses: thus, if we wish to divide one grain of strychnia into twenty doses, it may be thoroughly triturated with nineteen grains of sugar of milk, and one grain of the mixture gives the required dose. Or, one grain of podophyllin, which, in general, is a cathartic dose, by long trituration with ten grains of sugar of milk, will form several purgative doses. In these cases, the trituration should always continue for from one hour to an hour and a half. As a medicinal agent Sugar of Milk is inert.

SAGAPENUM.

Sagapenum.

THE GUM-RESIN OF AN UNCERTAIN PLANT.

History.—This gum-resin is brought from Alexandria, Smyrna, and other parts of the Levant. It is the concrete juice of a plant growing

in Persia, the history of which is not fully known. It is in irregular masses, composed of agglutinated fragments, slightly translucent, of a brownish-yellow, olive, or reddish-yellow color externally, paler internally, brittle, in consistence resembling wax, with an alliaceous odor, and a hot, nauseous, bitterish taste. It softens and becomes tenacious by the heat of the hand. It is almost entirely soluble in diluted alcohol. Age and exposure harden it as well as render it darker. It is inflammable, burning with a white flame and considerable smoke, and leaving a light spongy charcoal. An inferior kind is browner, softer, and uniform, without any appearance of tears. It consists of resin, gum, bassorin, volatile oil, salts, etc. The oil is pale-yellow, very fluid, lighter than water, and of an intense alliaceous odor.

Properties and Uses.—Gentle stimulant, antispasmodic, and emmenagogue; inferior to assafetida. Occasionally employed externally as a discutient, in the form of plaster, to indolent tumors. Dose from ten to thirty grains, in pill or emulsion.

SAGUS RUMPHII.

Sago.

Nat. Ord.—Palmaceæ. *Sex. Syst.*—Monœcia Hexandria.

THE PREPARED FECULA OF THE PITH.

Description.—The *Sagus Rumphii*, or *Sago Palm*, is one of the smallest trees of the family to which it belongs, seldom exceeding thirty feet in height. The *trunk* is, proportionably, very thick, quite erect, cylindrical, covered with the remains of the old leaf-stalks, and surrounded by a beautiful crown of foliage, consisting of numerous, very large, pinnate *leaves*, extending in every direction from the summit, and curving gracefully downward. From the basis of the leaves proceed long, divided and subdivided *flowers*, and *fruit-bearing spadices*, the branches of which are smooth. The *fruit* is a roundish nut, covered with a checkered imbricated coat, and containing a single seed.

History.—This tree is a native of Malacca, and the adjacent islands, thriving in low and moist situations. Previous to maturity, the trunk consists of an external ligneous part about two inches in thickness, and an internal spongy medullary substance, somewhat like the pith of elder. After the appearance of fruit, this internal substance is gradually absorbed, and the trunk eventually becomes hollow. The maximum age of the tree does not exceed thirty years. There are two other species of palm known to produce sago, namely: *Sagus Lævis*, Jack, or *Sagus Inermis*, Roxburgh, a native of Borneo and Sumatra; and *Sagueris Rumphii*, abounding in all the eastern isles of the Indian Ocean. These, with the *Sagus Rumphii*, contain a farinaceous pith, and probably furnish the finest kinds of sago. Sago has likewise been obtained from the

Sagus Ruffia, *Phoenix Farinifera*, *Cycas Revoluta*, *Cycas Circinalis*, *Zamia Lanuginosa*, and *Caryota Urens*.

As soon as the pith or medullary matter has become fully developed, the tree is cut down, and the pith extracted. This is then reduced to a coarse powder, and stirred with water; the water is allowed to stand until the starch has subsided, and is then strained off; the remaining amylaceous matter is then made into cakes, dried, and used by the natives as food, under the name of *Meal Sago*. When made into a paste with water, and rubbed into grains, it forms the *Granular Sago* of commerce. Sago is abundantly manufactured in the Moluccas, but the finest quality is obtained from the eastern coast of Sumatra. In several places it is refined by some process not yet satisfactorily ascertained, and which gives the grains a fine pearly luster. In this state it is called *Pearl Sago*. A single tree, it is stated, will yield from five to six hundred pounds of sago.

Sago Meal is rarely met with in this country, though imported into England. It is in the form of a fine amylaceous powder, of a pale yellowish-white, or reddish-white color, of a feeble, somewhat musty, peculiar odor, and composed of unbroken starch globules. Under the microscope it is found to consist of oval or ovate particles, many of which appear as if truncated, so as to be more or less muller-shaped. They are generally more or less broken, and the surface of the greater part of them is irregular or tuberculated. Their surface exhibits concentric rings, which, however, are not so distinct as in the potato-starch. The hilum is circular when perfect, and cracks either with a simple slit, a cross, or in a stellate manner. *Common Sago* is in roundish grains of the size of pearl-barley, or sometimes larger, mottled with various tints of gray and brown, and composed of aggregated, unbroken globules. Under the microscope, their appearances are similar to those of the sago meal, except that they are less regular, and more broken. The above varieties do not yield any soluble starch or amidin to cold water. *Pearl Sago* is the kind most generally used, and is the most esteemed. It is in pale yellowish-white, reddish-white, grayish-white, or translucent grains, about the size of a pin's head, inodorous, nearly tasteless, of a somewhat pearly luster externally, and forms a solution with cold water which is rendered blue by tincture of iodine. A solution of chloride of lime will render it perfectly white. Its partial solubility in cold water, is, probably, owing to the action of heat used in preparing it. It possesses the chemical properties of starch. Under the microscope, the granules are of the same form as in the preceding, but are all ruptured, and exhibit very indistinct traces of the external concentric rings, which have been, undoubtedly, altered in the process employed in their preparation.

Common Sago is insoluble in cold water, but upon being boiled, it becomes at first soft and transparent, and ultimately forms a gelatinous

solution. Pearl sago is more soluble. Imitation pearl sago, prepared from potato-starch, may be known by exhibiting larger granules under the microscope, which are more regularly oval or ovate, smoother, less broken, and more distinctly marked with the concentric rings on their surface; and when cracks occur at the hilum, they are usually in two diverging fissures.

Properties and Uses.—Sago is nutritive and demulcent, and is a convenient and agreeable article for making puddings, gruel and diet drinks for the sick room. It should always be long boiled before it is used. It is not so much used as formerly, being superseded by the purer arrow-root and tapioca. A tablespoonful of sago to a pint of water, is sufficient for ordinary purposes; and the solution may be sweetened with loaf-sugar, and seasoned with nutmeg or other spice, wine, etc., when these are not contra-indicated.

Castillon's Powders, a popular article of diet for invalids, in cases of indigestion, chronic dysentery, etc., is composed of Sago, Salep, Tragacanth, of each, in powder, four drachms, powdered prepared oyster-shells one drachm. These are to be well mixed, and divided into twelve powders; sometimes it is colored with a small quantity of cochineal. For use, each powder is to be boiled with a pint of milk; which may be sweetened and flavored to suit the patient's taste.

SALIX ALBA.

Willow.

Nat. Ord.—Salicaceae. *Sex. Syst.*—Dioecia Diandria.

THE BARK.

Description.—*SALIX ALBA*, or *White-willow* is a tree from thirty to eighty feet in height, with numerous round, widely spreading branches, the younger of which are silky. The bark is brown, thick, and full of cracks; that of the smaller branches smooth and greenish. The leaves are alternate, on short petioles, lanceolate, or elliptic-lanceolate, broadest a little above the middle, pointed, tapering toward each end, acutely serrate with the lower serratures glandular; both sides of a grayish, somewhat glaucous, green, beautifully silky, with close-pressed silvery hairs, especially on the under surface, and which is very dense and brilliant on the uppermost, or youngest leaves; the lowermost on each branch, like the bractes, are smaller, more obtuse, and greener. The stipules are variable, either roundish or oblong, small, and often wanting. The flowers appear at the same time with the leaves. The aments are on short stalks, with three or four spreading, leafy bractes, terminal, cylindrical, and elongated. Scales brown, elliptical, lanceolate, pubescent at the margin; those of the barren aments narrower toward the base; of the fertile, dilated and convolute in that part. Stamens two, yellow,

rather longer than the scales, with one obtuse gland before, and one behind; *filaments* hairy in their lower part. *Anthers* roundish, yellow. *Ovary* very nearly sessile, green, smooth, ovate-lanceolate, bluntish, longer than the scale. *Style* short; *stigmas* short, thick, two-parted, recurved, and nearly sessile. *Capsule* ovate, brown, smooth, rather small.

History.—The White or European Willow has been introduced into this country from Europe, and is now very common. It flowers in April and May; and the bark is easily separable throughout the summer. When dried it rolls up into quills, having a brown epidermis, and being flexible, fibrous, and of difficult pulverization. It has a feebly aromatic odor, and a peculiar, bitter, astringent taste. Water extracts its active properties, and the decoction is of a reddish-brown color. Willow bark contains a large proportion of tannin, a bitter yellow coloring matter, a green fatty matter, gum, wax, lignin, an organic acid combined with magnesia, and a crystalline principle, named *Salicin*.

There are not less than one hundred and thirty species comprised in this genus, which chiefly abound in the northern and temperate parts of Europe and America; and probably all of them are possessed of similar medical properties in a greater or less degree. The best method of determining the value of the various species, is, probably, by the degree of bitterness in the bark. Among those which have been used, are the *S. Alba*, *S. Caprea*, *S. Fragilis*, *S. Russelliana*, *S. Purpurea*, and *S. Pentandra*. The Weeping Willow or Babylonian Willow, *Salix Babylonica*, is cultivated as an ornamental tree.

Properties and Uses.—Willow-bark is tonic and astringent, and has been employed as a substitute for Peruvian bark in intermittent fever, to which, however, it is inferior. In chronic diarrhea and dysentery, the tonic and astringent combination of the willow, renders it very eligible. It may be given in substance, in doses of one drachm of the powder, repeated as indicated; or of the decoction, one or two fluid-ounces, four or five times a day. The decoction has also proved efficacious as a local application to foul and indolent ulcers.

SALIX NIGRA, *Black*, or *Pussy Willow*, is a tree growing from fifteen to twenty-five feet high, covered with a rough blackish bark, and found on the banks of rivers, especially in New York and Pennsylvania. The *leaves* are narrowly lanceolate, pointed and tapering at each end, serrulate, smooth and green on both sides; *petioles* and *midveins* tomentose. The *stipules* are small, deciduous, dentate; *aments* erect, cylindric, villous; *scales* oblong, very villous. *Sterile aments* three inches long; *glands* of the sterile flowers two, large, and deeply two or three cleft. *Stamens* four to six, often but three in the upper scales; *filaments* bearded at base. *Ovary* pedicellate, smooth, ovoid; *style* very short; *stigmas* bifid. The *branches* are pale yellow, and brittle at base, and are

much used for the manufacture of baskets and other kinds of wicker-work. The bark of black or pussy willow, is recommended as a poultice in gangrene, and as an external application to foul and indolent ulcers, in which it stands unrivaled. It is made by simmering the powdered bark in cream. It has also been successfully used in various swellings of the neck. Internally, the root is a bitter tonic, effectual in intermittents. Some have highly recommended it in asthma and gout. A decoction of the black willow buds or aments is useful in gangrene, taken internally, and applied locally; and drank freely it proves a powerful anaphrodisiac, suppressing venereal desires for a long time, and is highly recommended in the treatment of spermatorrhea.

SALICIN.

Salicin.

THE ACTIVE PRINCIPLE OF THE WILLOW.

Preparation.—Several processes are given for the preparation of Salicin. Merck obtained 251 grains from sixteen ounces of the bark and young twigs, by the following process: Treat a boiling concentrated decoction of the bark with litharge, until it becomes nearly colorless; this removes the gum, tannin and extractive from the liquid, the presence of which would impede the crystallization of the salicin, while at the same time a portion of the oxide is dissolved, probably in union with the salicin. To separate this portion of oxide, sulphuric acid is first added, and then sulphuret of barium, and the liquor is filtered and evaporated. Salicin is deposited, and may be purified by repeated solution and crystallization. Erdmann obtained 300 grains of salicin, from sixteen ounces of the bark of *Salix Pentandra*. Sixteen ounces of the bark are macerated for twenty-four hours in a mixture of four quarts of water, and two ounces of lime, and the whole is then boiled for half an hour. This process is repeated twice with the residue. The decoctions are mixed, allowed to become clear by subsidence, the liquor poured off, and concentrated to a quart; this concentrated liquid is then digested with eight ounces of ivory-black, filtered, and evaporated to dryness. The extract in powder is then exhausted with spirit containing 28 per cent. of alcohol, and the tincture evaporated, or the spirit distilled off, so that the salicin may crystallize. It may be purified by again dissolving, treating with ivory-black, and crystallizing. Another method is as follows:—Willow-bark is boiled with caustic lime in water; the decoction is filtered, and sulphate of zinc added so long as it produces a precipitate. The liquid having been again filtered, is evaporated to the consistence of an extract, and the residue is treated with alcohol. The tincture thus obtained, if carefully evaporated, yields crystals of salicin, which may be purified by washing with a saturated solution of the same principle in cold water.

History.—Salicin, when pure, is white, forming minute, shining, rectangular crystals, permanent in the air, inodorous, of a persistent bitter taste with the peculiar aromatic flavor of the bark, soluble in twenty parts of temperate water, and also soluble in alcohol, but insoluble in ether or oil of turpentine. It is a neutral body and is not precipitated by any reagent. Concentrated sulphuric acid decomposes it, forming a new compound of a permanent bright-red color, called *Rutulin*. Distilled with bichromate of potassa and sulphuric acid, it yields formic and carbonic acids, hyduret of salicycle, and a resinous matter. Hyduret of salicycle, or *salicylous acid*, is an oily colorless liquid, having a fragrant aromatic odor, and a burning taste. Its specific gravity is 1.1731, it boils at about 380°, and its formula is $C_{14} H_5 O_4, H=Sa H$. With bases it forms salicylurets, water being separated. It may be obtained by distilling one part of salicin, one part of bichromate of potassa, two and a half parts of sulphuric acid, and twenty parts of water, together. The salicin is dissolved in part of the water, and the acid diluted with the rest. The mixture is then made in a retort, and after the effervescence which takes place is over, the whole is distilled, and yields the hyduret, to the amount of one-fourth of the salicin employed. By contact with synaptase, salicin is decomposed, being resolved into grape-sugar and a new body called *Saligenine*; this latter, boiled with a diluted acid, or heated beyond its melting point, is changed into a white, tasteless, insoluble, resinous powder, named *Saliretin*. The formula of salicin is $C_{26} H_{18} O_{14}$.

Properties and Uses.—Salicin is tonic, antiperiodic, and febrifuge; and may be used as a substitute for quinia, to which, however, it is slightly inferior. It is, however, less likely to offend the stomach and affect the nervous system, for which properties it may be administered in cases where cinchonism would be produced by the exhibition of quinia. It is often employed to adulterate quinia with, and may be detected by sulphuric acid, which will turn the Salicin red, even in minute quantity. The dose of salicin is from two to ten grains to be repeated three or four times a day; three doses of six grains each, have been known to cut short intermittent fevers in one day.

Off. Prep.—Salicin; Quiniæ et Salicinæ Tartras.

SALVIA OFFICINALIS.

Sage.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Diandria Monogynia.

THE LEAVES.

Description.—*Salvia Officinalis* or *Garden Sage* is a perennial, shrubby plant, about two feet in height, with a quadrangular, pubescent, branching stem. The leaves are opposite, petiolate, ovate-lanceolate, crenulate,

wrinkled, of a grayish-green color, sometimes tinged with red or purple; the lowermost tomentose beneath. The *flowers* are blue, variegated with white and purple, and arranged in long, terminal spikes, composed of distant whorls, each composed of few flowers, and accompanied with sessile, ovate, acuminate and deciduous *bracts*, which are membranous and striated at the base. The *calyx* is campanulate, membranous, colored, striated, downy, and bilabiate; the upper lip is three-toothed, the lower bifid; all the teeth subulate, acuminate. The *corolla* is two or three times as long as the calyx, with a large projecting tube, ringed in the inside, and bilabiate; the upper lip is arched and concave, and the lower one divided into three rounded lobes, of which the middle is the largest, the lateral ones reflexed. The *stamens* are affixed to short pedicels transversely about their middle.

History.—Sage is indigenous to the South of Europe, and is extensively cultivated in gardens in this country, where it flowers in June, at which time the leaves and tops which are officinal, should be collected, and dried in a shady place. They have a strong, fragrant odor, and a warm, bitterish, aromatic, somewhat astringent taste, which are due to the presence of an abundance of volatile oil containing considerable camphor, and which may be obtained by distillation with water. It imparts its virtues to boiling water in infusion, but more readily to alcohol. The infusion becomes black on the addition of sulphate of iron. Numerous other species have similar properties as the *S. Sclarea* or *Clarry*, a native of Southern Europe, which is said to be antispasmodic and balsamic. Also the *S. Horminum*, *S. Bengalensis* of India, *S. Pomifera* of Greece, etc.

Properties and Uses.—Sage is feebly tonic and astringent, expectorant, diaphoretic, and having properties common to aromatics. An infusion is beneficial in flatulence connected with gastric debility, and will, it is stated, prove efficacious in checking the exhausting sweats of hectic fever; it may likewise be used warm, as an anthelmintic, and for the purpose of causing diaphoresis in some febrile diseases. The warm infusion will cause active diuresis by checking its diaphoretic tendency. Dr. James Anton of Georgia, considers it an excellent remedy for spermatorrhea; also a valuable antiphrodisiac to check excessive venereal desires. It may be used in connection with moral, hygienic, and other aids, if necessary. Van Swieten states that a vinous infusion forms an excellent fomentation to the breasts of nurses, when it is desirable to check the flow of milk. The infusion is much used as a gargle for inflammation and ulceration of the throat, and relaxed uvula, either alone, or combined with vinegar, honey, alum, or sumach berries. The oil may be used in small doses as a carminative and stimulant; and externally, applied with friction in rheumatism. Dose of the infusion, from two to four fluidounces, three or four times a day; of the powdered leaves, twenty to thirty grains.

SALVIA LYRATA, variously named *Wild* or *Meadow Sage*, *Lyre-leaved Sage*, or *Cancer Weed* is a perennial plant, growing from Canada to Florida in shady woods and meadows, and flowering in May and June. It has an erect quadrangular, nearly leafless *stem*, one or two feet high, branching above and covered with hairs pointing downward. The *radical leaves* are obovate, lyre-shaped or sinuate-pinnatifid, sometimes almost entire, and petiolate; the *cauline leaves* mostly but one or two pairs, just below the raceme, smaller and narrower than the radical. The *flowers* are blue, in loose and distant whorls of about six, forming a long, interrupted raceme; *bracts* oblong-linear, not longer than the calyx. The *upper lip* of the blue-purple pubescent corolla, short, straight, not vaulted; the *tube* much exserted. The fresh radical leaves of this plant will, it is positively asserted, when bruised, and applied to warts, generally destroy them; the application to be continued for a day or two, and renewed every twelve hours. It is also reputed to have cured cancers.

Off. Prep.—Infusum *Salviæ Compositum*.

SAMBUCUS CANADENSIS.

Elder.

Nat. Ord.—Caprifoliaceæ. *Sex. Syst.*—Pentandria Trigynia.

THE FLOWERS AND BERRIES.

Description.—*Sambucus Canadensis* is an indigenous shrub from six to ten feet high, with a branching *stem*, which is covered with a rough gray bark, and contains a large spongy pith. The small branches and the leafstalks are very smooth. The *leaves* are opposite, pinnate, sometimes bipinnate, and generally composed of three or four pairs of leaflets, with an odd one, and which are oblong-oval, serrate-acuminate, smooth, shining, deep-green, with the midribs somewhat pubescent; the lower ones are often trifoliate. *Petioles* smooth. The *flowers* are small, white, and disposed in loose cymes, which are level-topped and five-parted. The *fruit* consists of numerous small, globular berries, which are of a dark-purple color when ripe.

SAMBUCUS NIGRA or *European Elder*, is larger than the preceding, approaching in size to that of a small tree. The *stem* is much and irregularly, though always oppositely branched, and of quick growth; after a year's growth the branches become filled with a light spongy pith, and covered with a smooth gray bark. The bark of the stem is rough and whitish. The *leaves* are long, and composed of two opposite pairs of leaflets and an odd terminal one, which are oval, acuminate, serrate, smooth, and of a shining green color. The *flowers* are small, numerous, cream-colored, and form large five-parted cymes; the *calyx* is persistent, five-cleft; the *corolla* rotate, five-cleft, with obtuse and somewhat reflexed segments. The *stamens* are five, subulate, as long

as the corolla, and furnished with roundish, cordate, yellow anthers. The *ovary* is ovate, supporting three obtuse stigmas. The *fruit* is a globular berry, of a purplish-black color when ripe, on a reddish footstalk.

History.—*Sambucus Canadensis* is an indigenous shrub growing in all parts of the United States, in low moist grounds, thickets, and waste places, flowering from May to July, and maturing its berries early in the autumn. *S. Nigra* is indigenous to many parts of Europe, growing in situations similar to those of the American variety. The two plants possess similar medical properties. The officinal parts are the flowers, the berries and the inner bark.

The *flowers* have a peculiar sweetish odor, very strong when recent, but feeble when dried; they are somewhat aromatic, with a bitterish taste, and yield their properties to hot water in infusion. The active principle probably depends upon a volatile oil, which is dissipated by boiling, but which may be obtained by distillation with water; when cold it has the consistence of butter. Water distilled from the flowers contains ammonia in appreciable quantity. They contain volatile oil, acrid resin, tannin, extractive, etc.

The *berries* are nearly inodorous, with a sweetish, acidulous taste; the juice expressed from them is susceptible of fermentation, and forms a vinous liquor. It is of a purplish color, and may be used as a delicate test for acids and alkalies. Acids color it bright red, and alkalies violet; and acetate of lead precipitates its coloring principle blue. The berries contain malic acid, a little citric acid, sugar, pectin, and coloring matter.

The *inner bark* is greenish-white, inodorous, of a sweetish taste at first, but subsequently slightly bitter, acrid, and nauseous, and imparts its properties to water or alcohol. Its active principle is stated by Simon to be a soft resin, which may be obtained by exhausting the powdered bark with alcohol, filtering the tincture, evaporating to the consistence of syrup, then adding ether, which dissolves the active matter, and finally evaporating to the consistence of a thick extract. Twenty grains of this will purge and vomit actively. The bark contains valerianic acid, traces of volatile oil, resin, albumen, an acid sulphurous fat, wax, chlorophylle, tannic acid, grape-sugar, gum, extractive, starch, pectin, and various salts.

Properties and Uses.—In warm infusion the *flowers* are diaphoretic, and gently stimulant; in cold infusion they are diuretic, alterative, and cooling, and may be used in all diseases requiring such action, as in hepatic derangements of children, erysipelas, erysipelatous diseases, etc. In infusion with maidenhair and beech-drops, they will be found very valuable in all erysipelatous diseases. The *expressed juice of the berries*, evaporated to the consistence of a syrup, is a valuable aperient and alterative; one ounce of it will purge. An infusion of the young leaf-buds are likewise purgative, and sometimes act with violence. The flowers

and expressed juice of the berries have been beneficially employed in rheumatic, gouty, eruptive, scrofulous, and syphilitic diseases. The *inner green bark* is cathartic; an infusion of it in wine, or the expressed juice will purge moderately, in doses of from half a fluidounce to a fluidounce; large doses produce emesis; in smaller ones it proves an efficacious deobstruent, promoting all the fluid secretions, and is much used in dropsy, especially that following scarlatina, and other febrile and exanthematous diseases, as well as in many chronic diseases. Beaten up with lard or cream, it forms an excellent discutient ointment, and which is of much value in burns, scalds, and some cutaneous diseases. The juice of the root in ounce doses, daily, acts as a hydragogue cathartic and diuretic, and will be found valuable in all dropsical affections.

Off. Prep.—Aqua Sambuci; Syrupus Sarsaparillæ Compositus; Unguentum Sambuci; Vinum Sambuci.

SANGUINARIA CANADENSIS.

Bloodroot.

Nat. Ord.—Papaveraceæ. *Sex. Syst.*—Polyandria Monogynia.

THE ROOT.

Description.—Bloodroot, or *Red Puccoon*, as it is sometimes called, is a smooth, herbaceous, perennial, indigenous plant, with a horizontal, truncate or premorse root or *rhizoma*, giving off a few fibers, and abounding in a bright-orange juice; it is about as thick as the finger, two or three inches long, fleshy, reddish-brown externally, and brighter red internally. From each bud of the root-stalk there springs a single, large, smooth leaf, and a *scape* about six inches high, with a single flower; and as they arise, the folded-leaf envelops the flower-bud, and rolls back as the latter expands. The *leaf* is erect, supported on a long channeled petiole, cordate or subreniform, with large roundish lobes separated by obtuse sinuses, yellowish-green on the upper surface, paler on the under, and strongly marked by orange-colored veins. The *scape* is erect, round, and smooth. The *flower* is white, scentless, of a quadrangular outline, and of short duration. The *calyx* formed of two concave, ovate, obtuse sepals, which fall off as soon as the corolla expands; the *corolla* is composed of eight (or more, by cultivation) petals, which are spreading, ovate, obtuse, concave, white, but sometimes slightly tinged with rose or purple. The *stamens* are numerous, short, with oblong, orange-colored *anthers*. The *ovary* is oblong, and compressed, and supports a sessile, persistent, somewhat two-lobed *stigma*. *Style* wanting. The *capsule* is oblong, acute at each end, two-valved, and contains numerous, obovate, dark shining red *seeds*, half surrounded by a white arillus. The whole plant is pervaded with an acrid orange-colored juice, which is in greatest abundance in the root.

History.—Bloodroot is found in most parts of the United States, growing in woods, groves, and on shaded banks, in rich light soil; it is one of the earliest and most beautiful spring-flowers of this country, appearing in March and April. When dried, bloodroot is in pieces from one to three inches in length, from three to nine lines in thickness, somewhat flattened, much wrinkled and twisted, often furnished with abrupt offsets and numerous short fibers, of a reddish-brown color externally, with a spongy, uneven fracture, and of a bright-orange color internally, but which becomes dull brown by long exposure. It forms a brownish orange-red powder. It has a faint virose odor, and a bitterish, very highly and persistently acrid taste. It imparts its properties to boiling water or alcohol. The root should be kept in a dry place; age or moisture impairs its activity. An alkaloid and resinoid are prepared from the root, the former termed *Sanguinarina*, the latter *Sanguinarin*.

Properties and Uses.—Bloodroot is an acrid emetic, with narcotic and stimulant properties; it is also expectorant, sudorific, alterative, emmenagogue, tonic, antiseptic, detergent, escharotic, and errhine, according to the mode in which it is employed. It is a very active agent, and is capable of exercising a powerful influence on the system. When given in small doses it stimulates the digestive organs, and accelerates the circulation; in larger doses, it occasions nausea and consequent depression of the pulse; and in a full dose, it produces active vomiting. In overdoses it causes violent emesis, a burning sensation in the stomach, tormenting thirst, faintness, vertigo, dimness of vision, alarming prostration, and even death. It has been successfully used in pulmonary and hepatic affections, catarrh, croup, pertussis, typhoid pneumonia, rheumatism, jaundice, dyspepsia, and hydrothorax, either as an emetic, nauseant, or alterative. In torpid conditions of the liver it is very valuable, and it has also proved beneficial in scrofula, amenorrhœa, and dysentery. Used as a snuff, either alone or combined with bayberry bark, it is beneficial in coryza, some headaches, and is recommended as a remedy for nasal polypus. Applied to fungous growths, indolent and ill-conditioned ulcers, and fleshy excrescences, the powder often proves of utility, removing the fungous growth by its escharotic action, and creating a new and healthy energy in the ulcers. An infusion made in vinegar has been found valuable in several obstinate cutaneous diseases, tetter, ringworm, and warts. Dose of the powder, as an emetic, from ten to twenty grains; of the tincture, from twenty to sixty drops; as a stimulant or expectorant, from three to five grains; as an alterative, from half a grain to two grains. It may be used in powder, pills, tincture, or extract.

Off. Prep.—Acetum Sanguinariæ; Extractum Sanguinariæ Hydroalcoholicum; Mistura Sanguinariæ Composita; Pilulæ Taraxaci Compositæ; Pulvis Ipecacuanhæ Compositus; Pulvis Lobeliæ Compositus;

Pulvis Myricæ Compositus; Sanguinarin; Sanguinarina; Tinctura Lobeliæ Composita; Tinctura Sanguinariæ; Tinctura Sanguinariæ Acetata; Tinctura Sanguinariæ Composita; Tinctura Viburni Composita.

SANGUINARINA.

Sanguinarina.

THE ALKALOID PRINCIPLE OF BLOODROOT.

Preparation.—Digest six ounces of finely powdered bloodroot in twelve ounces of diluted muriatic or acetic acid; at the expiration of ten days, filter, and add to the filtered tincture two and a half ounces of aqua ammonia, and pour the mixture into a vessel containing two pints of distilled water; filter and collect the brown matter which subsides, and carefully wash it with a small quantity of distilled water, and remove the coloring by means of purified charcoal. Then treat it with boiling alcohol, which dissolves the sanguinarina, and cautiously evaporate. Or it may be prepared by forming a strong ethereal tincture of the root; passing through this muriatic acid gas, drying the precipitated muriate which is insoluble in ether, dissolving it in hot water, filtering, precipitating by ammonia, drying the precipitate, dissolving it in ether, decolorizing by animal charcoal, again precipitating by means of muriatic acid gas, and decomposing the muriate as before.

History.—Pure sanguinarina is a white, pearly substance, of an acrid taste, sparingly soluble in water, soluble in ether, and very soluble in alcohol. Exposure to the air changes it to a light yellow color. It forms soluble salts with the acids, which have some shade of red or scarlet, and are acrid and pungent to the taste. Its formula is $\text{NC}_{37}\text{H}_{16}\text{O}_8$.

Properties and Uses.—Same as the bloodroot. One grain of this alkaloid may be thoroughly triturated with twenty or thirty grains of sugar of milk, and divided into ten or thirty doses, according to the effect desired. However, it is not much used in practice, the *Sanguinarin* being preferred.

SANGUINARIN.

Sanguinarin.

THE ALKA-RESINOID PRINCIPLE OF BLOODROOT.

Preparation.—Take of coarsely pulverized bloodroot, any quantity, alcohol a sufficient quantity to make a saturated tincture. When made, filter the tincture and add distilled water equal in quantity to that of the alcohol; distil off the alcohol, and allow the residue to rest for several days, or until precipitation ceases. Remove the supernatant liquid, wash the precipitate in a fresh supply of distilled water, dry it carefully by a moderate heat, and pulverize for

use. As thus prepared it consists of a portion of the alkaloid *Sanguinarina* in combination with the *Sanguinarin*, and which is generally sold and used under the name of *Sanguinarin*.

History.—As thus prepared, sanguinarin is of a deep reddish-brown color, a peculiar odor, of a bitterish, rather nauseous taste, followed by a sense of pungency in the fauces, which is persistent, soluble in boiling alcohol, insoluble in water, and does not coalesce, unless it is heated or exposed to moisture. It is fusible, forming a black shining mass, and is also inflammable. It is partially soluble in alkaline solutions, acetic acid, and ether.

Properties and Uses.—This article is prepared by W. S. Merrell, and is an elegant and valuable, as well as important Eclectic agent. It possesses properties similar to bloodroot, and acts as a tonic, hepatic, and alterative. One or two grains, repeated every two hours, diminishes the velocity of the pulse in from eight to twelve hours; after which it only requires a small dose two or three times a day, to maintain its influence; and in effecting this sedative action on the arterial system, it does not produce any unfavorable cerebral results. It may be employed with advantage in the treatment of pulmonary diseases, influenza, whooping-cough, rheumatism, jaundice, etc. In combination with leptandrin and podophyllin it forms a medicine, which for safety and efficacy in the treatment of hepatic diseases is superior to any other remedies yet known in medicine; the combination may be formed into pills with extract of rhubarb, hydro-alcoholic extract of cimicifuga, or of bitter root. Combined with equal parts of caulophyllin, and hydro-alcoholic extract of cimicifuga, it will be found very efficacious in amenorrhea, dysmenorrhea, and other functional disorders of the female generative system. It may also be used as a sternutatory, and as a local application to indolent ulcers. When used alone it should be triturated with sugar, sugar of milk, or some other article. As a tonic, the dose is from one-fourth of a grain to a grain, three or four times a day; as a hepatic and alterative, from one-half of a grain to two grains.

SANGUIS DRACONIS.

Dragon's Blood.

RESIN OF CALAMUS DRACO.

Description.—*Calamus Draco* is a small palm growing in the Molucca Islands, and other parts of the East Indies. While the plants are young, the *trunk* is erect, and resembles an elegant, slender palm tree, armed with innumerable dark-colored, flattened elastic spines, often disposed in oblique rows, with their bases united. By age they become scandent, and overrun trees to a great extent. The *leaves* are pinnate, their sheaths and petioles armed as above described. The *leaflets* are single, alternate,

ensiform, margins remotely armed with stiff, slender bristles, as are also the ribs; from twelve to eighteen inches long and about three-fourths of an inch broad. *Spadix* of the female hermaphrodite inserted by means of a short, armed petiole on the mouth of the sheath opposite to the leaf, oblong, decompound, resembling a common oblong panicle. *Spathes* several, one to each of the four or five primary ramifications of the spadix, lanceolate, leathery; all smooth except the exterior or lower one which is armed on the outside. *Calyx* turbinate, ribbed, mouth three-toothed, by the swelling of the ovary split into three portions, and in this manner adhering, together with the corolla, to the ripe berries. *Corolla* three-cleft; divisions ovate-lanceolate, twice as long as the calyx, permanent. *Filaments* six, very broad, and inserted into the base of the corolla. *Anthers* filiform, and seemingly abortive. *Ovary* oval; *style* short; *stigma* three-cleft; divisions revolute, glandular on the inside. *Berry* round, pointed, of the size of a cherry.

History.—On the surface of the ripe fruit, an exudation forms, which is removed by rubbing, or shaking in a bag, or by exposure to the vapor of boiling water, or, finally, by decoction. The first two modes procure the finest resin, which comes in small oval masses, from a half inch to two inches in diameter, covered with the leaves of the plant, and arranged together in a row like beads when strung; sometimes it is found in cylindrical sticks, about a foot and a half in length, and from two to six lines in diameter, thickly covered with palm leaves, and bound round with slender strips of cane. In these forms it is opaque, pulverizable, and dark-reddish-brown, yielding a fine scarlet powder. It also comes in tears or small irregular fragments, in the form of a reddish powder. When the fruit is boiled in water, it yields an inferior resin, which is in flat circular cakes about an inch thick, and two or three inches in diameter, and which affords a fine red powder. That in large disks, six to twelve inches in diameter by an inch thick, is a very inferior article, and is usually mixed with pieces of the shell, stem, and other impurities.

Dragon's Blood is hard, opaque, brittle, with a smooth, shining fracture, of a deep red color, inodorous, tasteless, insoluble in water, but soluble in alcohol, ether, and the fixed or volatile oils. It is composed of 90.7 parts of a red resin, called *Draconin*, 2.0 of fixed oil, 3.0 of benzoic acid, 1.6 of oxalate of lime, and 3.7 of phosphate of lime.

Properties and Uses.—Dragon's Blood was formerly considered an astringent, and used in doses of from ten to thirty grains in passive hemorrhages, diarrhea, etc. It is sometimes used to impart color to plasters, in dentifrice preparations, and as an ingredient of paints and varnishes. It is an ingredient of the following preparation, which, whether deservedly or not, has acquired much reputation in the treatment of syphilis: Take of Dragon's Blood and Colocynth, of each, two drachms, Gamboge half an ounce, Sweet Spirits of Nitre and Balsam

Copaiba, of each, two ounces. Mix the first three articles in a mortar, and then add to them three gills of boiling water; keep it hot, and stir for one hour, then cool, and after uniting the last two, add them to the first mixture, stirring for some time. The dose is a half ounce to produce free catharsis; after which, a drachm, two or three times a day, to keep up a gentle action on the bowels. Notwithstanding the character of this compound, it is said to have effected cures in very severe forms of the disease.

SANICULA MARILANDICA.

Sanicle.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This is an indigenous, umbelliferous, perennial herb, sometimes known by the name of *Blacksnake Root*, with a stem from one to three feet high, smooth, furrowed, and dichotomously branched. The leaves are from three to five-parted, digitate, mostly radical, on petioles from six to twelve inches long; segments from two to four inches long, half as wide, oblong, irregularly and mucronately toothed. *Cauline leaves* few, nearly sessile. The flowers are mostly barren, white, sometimes yellowish; the sterile flowers on slender pedicels; the fertile ones sessile. *Segments of the calyx*, entire. *Involucres* six-leaved, serrate. *Umbels* often proliferous; *umbellets* capitate. *Fruits* several in each umbellet, and densely clothed with hooked bristles.

History.—Sanicle is common to the United States and Canada, and is found in low woods and thickets flowering in June. The root is the part used; it is fibrous, and has an aromatic smell and taste. Water or alcohol extracts its properties.

Properties and Uses.—Sanicle is nervine, tonic, astringent, and slightly anodyne; it is very analogous to valerian, and may be substituted for it. It has been used with advantage as a domestic remedy in intermittent fever, sore-throat, croup, hives, and other cutaneous diseases. It is very efficacious in chorea, in doses of half a drachm of the powdered root, three times a day, to children eight or ten years of age. It has also been beneficially employed in various other nervous affections. The decoction of it is said to be valuable in gonorrhea, dysentery, passive hemorrhages, and leucorrhea, administered in doses of from two to four fluidounces, and repeated three or four times a day. The decoction used freely, at the same time bathing the wound with it, is reputed a certain cure for the bites of poisonous snakes.

SAPO.

Soap.

Soaps embrace all those compounds which result from the reaction of salifiable bases with oils and fats. Oils and fats consist of two solid principles, and one liquid. Of the former, one is called *Stearin*, and is the chief ingredient of solid fats, as suet and tallow, the other is called *Margarin*, being the principal ingredient of soft fats, as lard; and the liquid *Olein* characterizes the fluid fats or oils. *Stearin* is considered to be a combination of stearic acid and glycerin, or an acid stearate of the oxide of glycerile; *stearic acid* is a firm, white solid, fusible at 167° , forming brilliant white needles on cooling, greasy to the touch, pulverizable, soluble in alcohol, very soluble in ether, but insoluble in water. It burns like wax, and is used in the formation of improved candles. *Margarin* is viewed as a combination of margaric acid and glycerin, or a margarate of glycerin; *margaric acid* is a white solid fat, of distinct acid properties, fusible at 140° , very soluble in hot alcohol, and in ether, and combines instantly with alkaline bases. *Olein* is a combination of oleic acid and glycerin, or an oleate of oxide of glycerile; *oleic acid*, is a colorless oily fluid at temperatures above 57° , but when once melted, it does not solidify until cooled to 40° , and when soluble it does not melt until heated to 57° , and crystallizes in needles a little below 32° . It rapidly absorbs oxygen from the air, and becomes brown, is insoluble in water, soluble in alcohol and ether, lighter than water, and has a slight smell and a pungent taste. It forms salts with bases. The theory of saponification is, that these fatty acids unite with the alkaline base and form soaps, which are stearates, margarates, or oleates, as the case may be, of the particular base which has been added, while at the same time a non-saponifiable, sweet principle is set free, called *glycerin*,—which see under its proper head "*Glycerina*." When these fatty acids combine with soda, potassa, or ammonia, they form soluble soaps; when united with earths and metallic oxides, as in the case of lead-plaster, lime-liniment, etc., the soaps formed are insoluble. Among the soluble soaps, those are the hardest which contain the most stearate, and those the softest which have a predominance of oleate, while an excess of margarate ranks in solidity between the two; again, those soaps formed with soda are the hardest and least soluble, while the reverse is the case with those formed with potassa. Consequently, the hardest and least soluble soap is a stearate of soda, while the softest and most soluble, is an oleate of potassa.

The theory of soap-making is very simple, depending on the affinity between the alkalies and the fat acids; on the solubility in water of the alkaline stearates, margarates, oleates, etc.; and, finally, on the power of a certain amount of free alkali or sea-salt, to coagulate the soap, and render it insoluble in the liquid in which it swims, and which in fact

runs off its surface as water does off the surface of fat, while yet the soap retains perfectly its solubility in pure water.

Preparation.—The fat or oil is boiled with a solution of caustic alkali, by which it becomes gradually dissolved in the water, if there be not too great an excess of alkali present, until a ropy or gelatinous solution is formed, capable of being drawn out into long clear threads. After the soap is fully made, it is then to be separated from the remaining excess of alkali, glycerin, and water. This may be accomplished by boiling the solution down, until a strong alkaline solution is obtained, in which the soap is insoluble, and it then rises to the surface in a soft, half-melted state. As soon as it ceases to froth in boiling it is ladled out into molds or frames, and on cooling forms soap, which is cut into bars by means of a wire. Another method of causing the soap to separate from the water in which it is dissolved, is to add a very strong alkaline ley, in which the soap is insoluble, or common salt which at once coagulates the soap, converting it into a soap of soda, if it be a soap of potassa. In either case the glycerin is carried off in the mother liquid. As first separated, the soap is called *Grain soap*, which may be purified by dissolving it in an alkaline ley, and separating it by common salt. During this process the impurities subside, the soap combines with more water, and becomes weaker, but purer and whiter. If grain soap be not purified it forms *marbled soap*, the marbled appearance being produced by adding to the soap as soon as it is completely separated, a fresh portion of ley, and immediately afterward a solution of sulphate of iron. The black oxide of iron is precipitated, giving rise to dark-colored streaks, which, by exposure to the air, become red, in consequence of the conversion of the black into the sesquioxide of iron.

History.—There are three varieties of soap, which are officinal, namely, Spanish or Castile soap, *Sapo Durus*, which is made with soda and olive oil. Common soap, *Sapo Vulgaris*, made with soda and a concrete animal oil; it is white, and usually formed from barilla and tallow, and is used as the only proper soap for making opodeldoc. Also Soft soap, *Sapo Mollis*, made with olive oil and potassa. It is likewise made with other oils, as oil from various seeds, fish oil, and much of it in our own country is made with refuse fat and grease, and a ley of wood ashes. It is a potassa soap, completely dissolved in an alkaline solution in excess. *White Castile soap* is a mixed margarate and oleate of soda; common soap is a stearate of soda, and soft soap is a mixed margarate and oleate of potassa. Beside these, there are other varieties used more or less for medicinal or economical purposes, as follows: *Sapo Amygdalinus*, or Amygdaline soap, made by adding to oil of almonds twenty-one ounces, in small proportions and stirring frequently, a solution of caustic soda, (at 1.334 sp. gr.) ten ounces; leave the mixture for some days at a temperature of 64° to 68° F., stirring

occasionally; then put into molds, until sufficiently solid. It should be exposed to the air for two months, before being used. *Sapo Animalis*, or Beef's marrow soap, made by boiling beef-marrow with two parts of water, and half a part of soda ley; when saponified, add one-fifth of common salt, stir, remove the soap from the surface, and place it in molds. *Sapo Terebinthine*, or Starkey's soap, made by triturating together equal parts of subcarbonate of potassa, oil of turpentine, and Venice turpentine, until they combine. *Sapo Windsor*, or Windsor soap, a scented soda soap, made of one part of olive oil, and nine parts of tallow. Likewise *Palm soap*, made of palm oil and soda, and to which tallow is added to increase its firmness. *Transparent soap*, prepared by saponifying kidney fat with soda free from foreign salts, drying the resulting soap, dissolving it in alcohol, filtering and evaporating the solution, and running it into molds when sufficiently concentrated. It is yellow or yellowish-brown, and preserves its transparency after drying. *Common Yellow or Rosin soap* derives its peculiarities from an admixture of rosin, and a little palm oil with the tallow employed, the oil being added to improve its color.

The several varieties of soap have the same general properties, as—a peculiar smell, a slightly alkaline taste, and being more readily soluble in hot than cold water, or alcohol. With alcohol it forms the *Tincture of soap*, which is a convenient test for discovering lime in natural waters. Soap is heavier than water, melts, swells up and is decomposed by heat, and renders grease soluble in water. Acids give a milky appearance to an aqueous solution of soap, in consequence of setting free the oily acids, which become diffused through the water.

Soap is adulterated by lime, gypsum, gelatin, etc., which may be known by its imperfect solubility in alcohol. Good white Castile Soap, is white, inodorous, entirely soluble in alcohol or water, is incapable of imparting an oily stain to paper, should not feel greasy, nor grow moist, but should become dry when exposed to the air, without exhibiting any saline efflorescence. Marbled castile soap is not so pure as the above. Soap is *incompatible* with all acids, which decompose it by uniting with its alkali, and setting free its fatty acids; also with earths and earthy and metallic salts, which form an insoluble soap with their base, and a saline combination between their acid and the alkali of the soap. It may be used in hard water, when this has had all its lime precipitated, by the addition of sufficient carbonate of soda or carbonate of potassa, in the form of carbonate of lime.

Properties and Uses.—Soap is antacid, antilithic, and in some measure laxative; it is usually given in combination with rhubarb in dyspepsia, torpor of the liver, and constipation. It has a tendency to correct the astringency of the rhubarb; and when combined with aloes, gamboge, or other resinous cathartics, it modifies in a greater or less degree their irritating properties. Being easily decomposed by the weakest acids,

which unite with its alkali, it has proved beneficial in acid stomach, and as a remedy in the uric acid diathesis, but it does not dissolve calculi. It has also been recommended in solution as a remedy for poisoning with the concentrated acids, in which case it should be administered without delay every two or three minutes, until chalk, lime, or the bicarbonates of potassa or soda can be had. Externally, it is a stimulating discutient, and has been used by friction, or in the form of plaster, in sprains, bruises, and various tumors. A strong solution of soft soap forms a valuable enema in constipation, especially when arising from hardened feces in the rectum. In the preparation of pills, liniments, or plasters, care must be taken not to associate soap with a substance which may be decomposed by it. The dose of soap, is from five grains to half a drachm, in the form of pill.

Off. Prep. of Common Soap.—Linimentum Cajuputi Compositum ; Linimentum Opii ; Linimentum Saponis Camphoratum.

Off. Prep. of Castile Soap.—Pilulæ Aloës Compositæ ; Pilulæ Podo-phyllini Compositæ ; Pilulæ Saponi Compositæ.

Off. Prep. of Soft Soap.—Unguentum Sulphuris Compositum.

SAPONARIA OFFICINALIS.

Soapwort.

Nat. Ord.—Caryophyllaceæ. *Ser. Syst.*—Decandria Digynia.

THE ROOT AND LEAVES.

Description.—This is a stout perennial herbaceous plant, sometimes known by the name of *Bouncing Bet*, with a *stem* from one to two feet in height. The *leaves* are lanceolate, inclining to elliptical, very acute, smooth, two or three inches long, and about one-third as wide. The *flowers* are many, large, flesh-colored or pale pink, often double and disposed in paniculate fascicles. The *calyx* is cylindrical, and slightly downy. *Petals* five, unguiculate ; *crowns of the petals* linear. *Stamens* ten ; *styles* two ; *capsule* oblong, one-celled.

History.—Soapwort is found growing in Europe and the United States, by roadsides and in waste places, flowering in July and August. The root and leaves are the parts employed ; they are inodorous, of a bitterish and somewhat sweetish taste, succeeded by a persistent pungency, and imparting a slight sense of numbness to the tongue. When agitated with water they form a lather like soap-suds, which property together with its medical virtues, depend upon a peculiar principle termed saponin, which constitutes about thirty-four per cent., of the dried root, the remainder being gum, bassorin, resin, extractive, lignin and water. Water or alcohol extracts the properties of the root and leaves. *Saponin* is obtained, though not absolutely pure, by treating the watery

extract with alcohol, and evaporating; it is brown, somewhat translucent, or, white and amorphous, hard, brittle, with a sweetish taste at first, then styptic, and finally, followed by a sense of acrimony in the fauces. It is soluble in water and officinal alcohol, but not in anhydrous alcohol, ether, or the volatile oils. When acted upon by alkalies, it is converted into saponic acid, $C_{26}H_{23}O_{12}$. Its aqueous solution froths when agitated, like a solution of soap.

Properties and Uses.—Soapwort is tonic, diaphoretic, and alterative; and forms a valuable remedy in the treatment of syphilitic, scrofulous and cutaneous diseases, also in jaundice, liver-affections, rheumatism and gonorrhea. It is generally used in decoction; although an extract, or the inspissated juice will be found equally efficacious. Dose of the decoction, from two to four fluidounces, three or four times a day; of the extract, or inspissated juice, from ten to twenty grains. Saponin, may be used as a substitute for the root, and will likewise be found a powerful sternutatory. Dose, from two to six grains.

SARRACENIA PURPUREA.

Sarracenia.

Nat. Ord.—Sarraceniaceæ. *Sex. Syst.*—Polyandria Monogynia.

THE ROOT.

Description.—This plant, also known as *Side-saddle Flower*, *Fly-trap*, and *Huntsman's Cup*, is an indigenous, perennial plant, of a very curious character. The *leaves* or *ascidia* are from six to nine inches long, radical, short-globose, inflated or cup-form, contracted at the mouth, having a broad arched lateral wing from half an inch to an inch in width, and extended on the outside of the mouth into a broad-cordate, erect lamina, or hood, covered above with reversed hairs. The *scape* is from one to two feet in height, terete, smooth, and supporting a single, large, purple, nodding flower.

History.—This plant owes its strange appearance to a curious pitcher-shaped metamorphosis of the leaf, which resembles very much an old-fashioned side-saddle; six of these generally belong to each plant. The leaf, which springs from the root, is formed by a large hollow tube swelling out in the middle, curved and diminishing downward till it ends in a stem, contracted at the mouth, and furnished with a large spreading, heart-shaped appendage at the top, which is hairy within, the hairs pointing downward, so as to cause everything which falls upon the leaf, to be carried toward the petiole; a broad wavy wing extends the whole length on the inside; these lie upon the ground with their mouths turned upward, so as to catch the water when it falls. They hold nearly a wineglassful, and are generally filled with water and aquatic insects, which undergo decomposition or a sort of *digestion*, and serve as nutri-

ment to the plant. The stem rises direct from the root, it is round, quite smooth, and bears an elegant, deeply reddish-purple terminal flower, having two flower-cups; the external consisting of three small leaves; the internal of five egg-shaped, obtuse leaves, shiny, and of a brownish-purple. The blossoms are five, guitar-shaped, obtuse, repeatedly curved inward and outward, and finally inflected over the stigma, which is broad and spreading, divided at its margin into five bifid lobes, alternating with the petals, and supported on a short cylindrical style; this is surmounted by the stamens, which are numerous, having short threads, and large two-celled, oblong, yellow anthers attached to them on the under surface. In the yellow-flowered species of the Southern States, the bottle is very long, resembling a trumpet, by which name it is often called.

The whole species are water plants, and are found only in wet meadows, wet boggy places, marshes, mud-lakes, etc., and are found from Labrador to Florida, flowering in June. There are several varieties, as the *S. Heterophylla*, found in the swamps at Northampton, Mass., and the *S. Rubra*, *S. Flava*, *S. Variolaris*, *S. Drummondii*, and *S. Psytta-cina*, which are common to the South, and all of which, probably, possess similar medical virtues. The root is the part used, it has a bitter and astringent taste, and yields its properties to water. It contains coloring matter, resin, an acid salt of lime, an unknown salt, and lignin.

Properties and Uses.—The therapeutical actions of *sarracenia*, are not fully ascertained. It is supposed to be a stimulating tonic, diuretic, and laxative; in connection with *Osmunda Regalis* and blue cohosh, it will form a valuable syrup for chlorosis, all uterine derangements, dyspepsia, and other gastric difficulties. An infusion of the leaf has been found equally available with that of the root. The best mode of employing it, is not well determined; though the powder may be given in doses of from twenty to thirty grains three or four times a day; and the infusion from one to three fluidounces. In relation to this plant, Dr. C. H. Cleaveland makes the following remarks:

“During the year 1847, Dr. F. P. Porcher, of South Carolina, experimented with the *root*, or that portion of the stem which is below the surface of the ground; and he details the following results: He thinks the *bitter*, and *astringent* principles of the plant are imperfectly extracted by water, and that the *decoction* is even more destitute of these properties, than the cold infusion. He made trial of the root, in a recent state, as well as of the dried root, on his own person, and he gives the following, as the result of one of his experiments: ‘Dec. 4th. We again commenced experimenting with it. It had become dry, having been rolled into pills of three grains each. Of these we took sixty (180 grs.), between ten and twelve o’clock, P. M., upon a comparatively empty stomach, swallowing them, at intervals, six or eight at a time. Its diu-

retic action in this instance was frequently repeated—the secretion being increased in quantity, pure, limpid, and colorless, with scarcely any sediment after several hours' standing.

“ ‘ Its action on the stomach, resembled that following its first employment, being attended with the same phenomena. A feeling of emptiness was produced in the course of an hour. After retiring to bed, the whole abdominal region was in a state of commotion—extending along the tract of the ascending and descending colon, all of which appeared to participate in a kind of rolling motion produced by it. To these, were added involuntary rumbling sounds, as if the entire alimentary tube was stimulated, and apparently forewarning a cathartic effect. We are led to believe, that its astringent property presented this result. There was, also, tenderness on pressure at the epigastrium.

“ ‘ The feeling of congestion about the head, with irregularity of the heart's action, which *lasted several days*, was again observed. Before morning, the pulse rose to 100 by the watch—resuming its usual frequency after a time. We were prevented by sleep, which was much disturbed, from ascertaining positively the co-existence of strange impressions on the sensorial functions. The general vigor of the digestive apparatus was increased. The appetite following the next day was unusually active—seeming to demand much more to satisfy its requirements; but there was a sense of pain about the stomach, like that following inflammation, or that felt in the muscular tissue after a limb has been overtaken.’

“ ‘ In the first experiment, in which Dr. Porcher took 140 grains of the *fresh* root, the symptoms produced were very similar to those detailed in the above quotation—pointing distinctly to the parts of the system influenced by the drug: namely, the gastric filaments of the ganglionic, or organic system of nerves. This produced an increased action of the circulatory system, and drove the blood to the head. It also increased the peristaltic motion of the entire alimentary canal, and promoted the renal, and other glandular secretions, without any apparent effect upon the nerves of animal life.

“ ‘ As the experiments of Dr. Porcher are directly corroborative of those made by the writer, and confirmatory of the utility of the plant in all cases where there is a sluggish or torpid condition of the stomach, the intestines, the liver, the kidneys, or the uterus, producing costiveness, dyspepsia, amenorrhea, dysmenorrhea, and the various functional derangements which are so commonly to be met with, it must be evident, that this plant possesses valuable properties, which render it well worthy the attention of the enlightened practitioner.

“ ‘ The plant has not yet been much used. It would, therefore, appear improper to speak of the best mode of preparing it, or of the amount necessary to be given to produce the desired result. Probably, however, it will seldom be found necessary to resort to the heroic doses

taken by Dr. Porcher, or to expect from its use the *immediate* effects observed by him. In almost all cases, gastric debility, dyspepsia, sick-headache, etc., are accompanied with a constipated condition of the bowels; and it would seem desirable to prepare the article in such a way as *not* to extract the astringent principle, whatever that may be; and doubtless the infusion or the syrup is as good a preparation as any. In those cases, however, which sometimes occur, when there is chronic diarrhea, without much inflammation of the intestines, it is altogether probable, that a cold infusion would be preferable.

"It is even possible, that a new salt, similar to morphia or quinia, might be extracted from the plant, and a new and valuable remedy be added to our *Materia Medica*."

SATUREJA HORTENSIS.

Summer Savory.

Nat. Ord.—Lamiaceæ. *Ser. Syst.*—Didynamia Gymnospermia.

THE LEAVES.

Description.—Summer Savory is an annual plant, with a branching and bushy *stem*, about eighteen inches in height, woody at base, frequently changing to purple. The *leaves* are numerous, small, linear-oblong, entire, acute at the end. The *flowers* are pink-colored, on axillary, cymose peduncles. The *calyx* is tubular, ribbed, and about as long as the corolla. The *corolla* is bilabiate, with nearly equal divisions; *stamens* diverging, scarcely exerted.

History.—This well known plant is a native of the south of Europe, and is extensively cultivated in the gardens of this country and Europe for culinary purposes, flowering in July and August. The leaves are the parts employed. They have an aromatic odor and taste, analogous to those of thyme, and impart their properties to boiling water in infusion, but more freely to alcohol. Its virtues depend upon a volatile oil.

Properties and Uses.—Summer Savory is stimulant, carminative, and emmenagogue. A warm infusion is beneficial in colds, menstrual suppression, and flatulent colic; the cold infusion is a gentle stimulating tonic, during convalescence from fevers. The infusion may be used in doses of from two to four ounces, several times a day. The oil is sometimes used as a local application to carious teeth for relieving toothache; and its tincture is a valuable carminative. The *S. Montana*, or Winter Savory, with mucronate leaves, somewhat one-sided peduncles, and acuminate and mucronate segments of the calyx, possesses similar properties.

SCILLA MARITIMA.

Squill.

Nat. Ord.—Liliaceæ. Ser. Syst.—Hexandria Monogynia.

THE BULB.

Description.—Squill is a perennial plant with a roundish-ovate *bulb*, very large, half above ground, with the integuments either pale-green or red, and giving off fibrous *roots*. The *leaves* proceeding from the bulb, are broad-lanceolate, channeled, spreading, recurved, shining, deep-green, and make their appearance long after the flowers. The *scape* is two or three feet high, and terminated by a rather dense, long, ovate raceme. The *flowers* are about three-fourths of an inch in diameter, spreading, pale yellowish-green, with a green mark on the middle of each segment. *Peduncles* purplish; *bracts* linear, twisted, deciduous. *Filaments* shorter than the segments of the perianth.

History.—Squill is a native of almost every part of the Mediterranean coast, and is also met with in Portugal and France. It flowers in August and September. Steinheil has proposed to remove it into a new genus under the name of *Squilla Maritima*, as the structures of its nectaries and seeds distinguish it from the genus *Scilla*. The only official part is the bulb. When recent it is pear-shaped, from three to six inches in its largest diameter, and consists of concentric scales, the outer ones of which are thin and membranous, while the inner are whitish, thick, fleshy, and full of juice; they weigh on an average from one to four pounds, though they have attained a weight of ten pounds and a half. There are two varieties known as the *Red* and *White Squill*; the former being distinguished by its reddish-brown external coat, its light-pink epidermis, and yellowish-white parenchyma of the inner scales; the latter being white throughout. The medicinal properties are the same in each. In the recent state the bulb contains a viscid, very acrid juice, which will inflame and even excoriate the skin, and the acrimony of which is much diminished by drying. When intended for medical use, squill bulbs ought not to be kept entire, but should be stripped of their outer scales, cut transversely into thin slices, and dried carefully at a temperature about 100° F. When recent, these slices have a mucilaginous, disagreeably bitter, and somewhat acrid taste, with a feeble radish-like odor.

As found in the shops of this country, dried squill is in irregular, oblong pieces, often more or less contorted, of a dull yellowish-white color, with a reddish or rosy tint, sometimes entirely white, translucent, brittle, and pulverizable when perfectly dry, but generally flexible from the presence of moisture, for which they have a great affinity. Occasionally a parcel will be found consisting of vertical slices, some of which adhere together at their base. The odor is very feeble, and the taste

bitter, nauseous, and acrid. Squill yields its properties to water, spirit, or diluted acids; but the best solvents are proof spirit or vinegar. It contains, according to analysis, *Scillitin*, gum, a trace of tannin, traces of citrate of lime and saccharine matter, lignin, and an acrid principle. When kept dry, squill retains its virtues for a long time, but exposed to moisture it speedily becomes moldy.

Scillitin may be obtained pure by treating a decoction of squill with acetate of lead, in order to separate the viscid matter, then filter, add finely powdered purified animal charcoal and when cold agitate briskly, and afterward allow it to rest. The charcoal, as it subsides, carries along the bitter and coloring principles. Decant the liquid, and dry the remaining solid matter, and treat it, when dried, with hot alcohol, which becomes intensely bitter. Distil off the alcohol, and allow the milky liquid which is left to evaporate spontaneously. *Scillitin* thus procured is pure, solid, uncrystallized, easily decomposable by heat, almost caustic to the taste, not deliquescent, neuter, slightly soluble in water, to which it imparts excessive bitterness, very soluble in alcohol, dissolved by concentrated sulphuric or nitric acid, but at the same time decomposed, and imparting to the first a purple color, instantly becoming black. By allowing the last alcoholic solution to evaporate spontaneously, *scillitin* has been obtained in long, flexible, needle-shaped crystals. A single grain has killed a dog.

A crystalline principle has been discovered in squill by Landerer, *Scillitina*, which is bitter, but not acrid, insoluble in water or the volatile oils, sparingly soluble in alcohol, and capable of neutralizing acids. It is procured by exhausting the bruised fresh bulb with diluted sulphuric acid, concentrating the solution, neutralizing it with lime, drying the precipitate, exhausting it with alcohol, and evaporating the tincture, which on cooling, deposits the *scillitina* in prismatic crystals. The acrid and bitter principles of squill are supposed to be distinct.

Properties and Uses.—Squill is irritant, emetic, cathartic, diuretic, and expectorant. In large doses it is a dangerous irritant poison, producing inflammation of the alimentary canal, and urinary organs, and proving fatal in the dose of only twenty-four grains of the powder. Some constitutions are so susceptible of its irritant action, that it cannot be safely used in any dose, unless combined with opium. It is seldom used as an emetic or cathartic, on account of its uncertainty in producing these effects. In small doses it causes nausea and depression of the pulse, and never stimulates the circulation. Its expectorant action is greatly increased by the addition of opium; and its diuretic by the conjunction of digitalis, or some other vegetable or saline diuretic. It is used in dropsy, catarrh, pneumonia, asthma, and phthisis. It acts better in general than in local dropsies, and also in those of an asthenic character. As an expectorant it will be found useful both in cases of deficient and of abundant secretion from the bronchial mucous membrane.

Troublesome vomiting or purging caused by squill is best corrected by opium. Where there is much inflammation or vascular excitement, it is contra-indicated. Dose of the powder, as a diuretic and expectorant, from one to three grains; as an emetic, from six to twelve grains; of the syrup, one or two fluidrachms. When given in substance, its best form is that of pill.

Off. Prep.—Acetum Scillæ; Syrupus Scillæ.

SCROPHULARIA NODOSA.

Figwort.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Didynamia Angiospermia.

THE LEAVES AND ROOT.

Description.—Figwort has a perennial, whitish, tuberous, and knotty root, with a herbaceous, erect, quadrangular, smooth stem, from two to six feet in height, with paniculate, opposite branches above. The leaves are opposite, petiolate, ovate, ovate-oblong, or the upper lanceolate, acute, sharply and unequally serrated, rounded, acutish, or broadly cordate at base, veined, of a deep green color, and from three to seven inches in length. The flowers are small, three or four lines long, ovoid, dark-purple, slightly drooping, and borne on axillary and terminal, forked, angular, glandular peduncles in oblong thyrsoid panicles. Calyx in five segments which are broadly ovate, obtuse, slightly margined; corolla of a dull green, with a livid purple lip, subglobose; limb contracted, sublabiate, having a green scale or sterile filament, adnate to the upper side. Stamens didynamous; sterile anthers, broadly orbicular. Capsule ovate-oblong.

History.—This plant is a native of Europe, and found growing in different parts of the United States, in woods, hedges, damp copses, and banks, flowering from July to October. The *S. Marilandica* and *S. Lanceolata*, known by the names of *Carpenter's Square*, *Healall*, *Square-stalk*, etc., are mere varieties, possessing similar medicinal properties. The leaves and root are the officinal parts, and yield their virtues to water or alcohol. The leaves have a rank, fetid odor, and a disagreeable, bitter taste; the root has also a nauseous odor, and a sweetish, subacid taste. Much of the odor and taste are lost by drying. The aqueous infusion, which is reddish, is blackened by the sulphate of the sesquioxide of iron. They contain a brown bitter resin, an extractive having the odor of benzoic acid, extractive, gum, starch, inulin, etc.

Properties and Uses.—Figwort is alterative, diuretic, and anodyne; highly beneficial in hepatic diseases, scrofula, cutaneous diseases, dropsy, and as a general deobstruent to the glandular system when used in infusion or syrup. Externally, in the form of fomentation, or ointment, it is valuable in bruises, inflammation of the mammæ, ringworm, piles,

painful tumors, itch, and cutaneous eruptions of a vesicular character. The root, in decoction, and drank freely, is said to restore the lochial discharge when suppressed, and to relieve the pains attending difficult menstruation. This plant possesses valuable and active medicinal properties. Dose of the infusion or syrup, from two to four fluidounces.

Off. Prep.—Decoctum Scrophulariæ ; Syrupus Rumecis Compositus.

SCUTELLARIA LATERIFLORA.

Scullcap.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE WHOLE HERB.

Description.—Scutellaria Lateriflora has a small, fibrous, yellow, perennial root, with an erect, very branching, diffuse, quadrangular, nearly glabrous stem, from one to three feet in high ; the branches are opposite. The leaves are on petioles about an inch long, opposite, thin, entire, nearly membranous, subcordate on the stem, ovate on the branches, acuminate, or acute, coarsely serrate and slightly rugose. The flowers are small, of a pale blue color, and are disposed in long, lateral, axillary racemes, with ovate, acute, entire, subsessile, distichous bracts, each flower axillary to a bract, and pedunculated. The calyx has an entire margin, which after the corolla has fallen, is closed with a helmet-shaped lid. The tube of the corolla about a quarter of an inch long, the upper lip concave and entire, the lower three-lobed. Seed, four in the closed calyx, oval, verrucose.

History.—Scullcap is an indigenous herb, growing in moist places, meadows, ditches, and by the sides of ponds, flowering in July and August. It is known by the names of *Blue-Scullcap*, *Side-Flowering Scullcap*, *Mad-Dog-weed*, and *Hood-Wort*. The whole plant is official ; it should be gathered while in flower, dried in the shade, and kept in well-closed tin vessels. It is inodorous, but has a bitterish taste ; alcohol or boiling water extracts its properties. Scullcap is said to contain an essential oil ; a fixed oil, yellowish-green, and soluble in ether ; a bitter principle soluble in water, alcohol, or ether ; chlorophylle ; a peculiar volatile matter ; albumen ; a sweet mucous substance ; a peculiar astringent principle ; lignin, chloride of soda and other salts.

Properties and Uses.—Scullcap is tonic, nervine, and antispasmodic. This is one of those valuable agents which a certain class of physicians consider inert ; yet it has proved especially useful in chorea, convulsions, tremors, intermittent fever, neuralgia and all nervous affections. In delirium tremens, an infusion drank freely will soon produce a calm sleep. In intermittents, it may be beneficially combined with bugle. Where teething has impaired the health of children, an infusion may be given with advantage. In all cases of nervous excitability, restlessness,

or wakefulness, attending acute or chronic diseases, or from other causes, it may be drank freely with every expectation of beneficial results. The warm infusion has a tendency to keep the skin moist; the cold has a tonic influence, and either may be drank freely. When its soothing effects have ceased, it does not leave an excitable, irritable condition of the system, as is the case with some other nervines. Half an ounce of the dried leaves or herb, to a half pint of boiling water, will make a very strong infusion. Scullcap has been extolled as a remedy in hydrophobia, but this is still a matter of uncertainty. The *S. Hyssopifolia* and *S. Integrifolia* possess similar properties.

The Pharmaceutical Institute of the city of New York, profess to have prepared a concentrated preparation of Scullcap, in the form of a whitish powder, which they name *Scutelline*, and recommend as a tonic, nervine, etc., highly useful in nervous diseases. Having never seen the article, and not having been able to learn its mode of preparation, which appears to be kept a secret, with many of their other preparations, I can only refer to it as an article *said* to have been prepared.

Off. Prep.—Extractum Scutellarie Hydro-alcoholicum; Infusum Scutellarie; Pilule Valeriane Compositae.

SECALE CEREALE.

Rye.

Nat. Ord.—Graminaceæ. *Sex. Syst.*—Triandria Digynia.

THE SEED OR GRAIN.

ERGOTA. (*Secale Cornutum.*)

Ergot. Spurred, or Smut Rye.

THE DISEASED SEEDS OF SECALE CEREALE.

Description.—Rye has a *stem* from four to six feet high, hairy beneath the spike, in a wild state seldom over a foot high. The *leaves* are lance-linear, rough-edged and rough above, glaucous; the lower ones, together with their sheaths, covered with a soft down. *Rachis* bearded on each side with white hairs. *Glumes* subulate, ciliated, scabrous, shorter than the florets, taken together with their awns. *Outer paleæ* folded up, keeled, tri-nerved, with very long awns; the two nerves and awns very rough. *Stamens* three. *Ovary* pyriform, pilose. *Stigmas* two.

History.—Rye is now cultivated in all temperate latitudes; though its native country is unknown. At present it is thought to be originally from the countries around Caucasus. Ground into fine flour, it is used as an article of diet in the form of bread or mush. Bread made from rye-flour is dark-colored, and less digestible than that from wheat. Rye in grain consists of water, flour, and envelope; the flour consists of starch, gluten, albumen, uncrystallizable sugar, gum, vegetable fiber, etc.

Rye is very subject to a disease, caused by the growth of a fungus on the grains, which is called Ergot, or Spurred Rye. In relation to this substance, much difference of opinion has existed, having been thought by some as the seed altered by disease ; by others as the result of excessive heat and moisture ; and again, as a morbid condition produced by an insect. The general view, at the present time, is, that it is caused by the growth of a fungus on the grain, and which opinion is strengthened by the microscopic observations of Mr. Quekett of London. He states that the beginning of the growth of ergot, is marked by the appearance of numerous minute filaments, which run over all parts of the young grain and its appendages, cementing anthers and stigmas together, and of a white coating upon the surface of the grain, from which a multitude of minute particles separate, and sink, when immersed in water. These particles are about the four-thousandth of an inch long, and are *sporidia* or the reproductive agents of a species of fungus, which may be observed to sprout and propagate in various ways, under favorable circumstances, and which give rise to the filaments. These sporidia and filaments do not increase with the growth of the ergot ; and when this has projected beyond the paleæ and become visible, it has lost a portion of its white coating, and presents a dark violet color. The grain increases rapidly, and attains its size in a few days, when it exhibits very few of the filaments or sporidia upon its surface. It is stated that this fungus exists independent of the perverted grain, and that the sporidia will, upon application to the seeds of other Graminaceæ before germination, give rise to ergotized fruit. Mr. Quekett believes that the germs of the fungus emit their filaments through the tissue of the ergot when young and tender, and that, as this increases, it is made up partly of the diseased structure of the grain, and partly of the fungous matter ; he named the fungus *Ergotæia Abortifaciens*. Ergot generally projects out of the glume beyond the ordinary outline of the spike, and sometimes wholly occupies the place of the seeds, and at others only two or three spurs will be found in a spike. When gathered before harvest it is said to be more energetic, and should not be collected until several days after its formation, as, according to M. Bonjean, it does not possess the poisonous properties on the first day of its formation, which it exhibits on the sixth.

Ergot is in grains of a somewhat cylindrical, or obscurely triangular form, slightly curved like a cock's spur, from a third of an inch to one inch and a half, or rarely two inches in length, from one to three lines in diameter, solid, brittle, marked with one or two longitudinal furrows, often irregularly cracked or fissured, obtuse at the extremities, and terminated at the apex by a pale-gray exerescence, which, however, is generally rubbed off in what is found in the shops ; externally, it is of a dingy purple hue, or violet-brown color, and often somewhat glaucous, and internally it is pale grayish-red, grayish-white, or violet-white. It

has, when pulverized, a peculiar, musty, unpleasant smell, and a sweetish, slightly bitter, obscurely acrid taste. It is lighter than water, somewhat of the consistence of horn, and under the microscope its external surface presents more or less of the sporidia, while its internal structure is composed of minute roundish cells, many of which, contain particles of oil. Unless kept carefully excluded from the air, it softens and swells, and becomes infected with numerous brown insects, about the size of a pin's head, while at the same time it acquires a deep black color and heavier odor. Its powder quickly becomes damp, and full of animalcules. It should always be used recently pulverized, or if kept in powder, it should be in well-closed and darkened vials, and with a few lumps of camphor added. It imparts its virtues to water or alcohol; long boiling renders it inert. The best ergot is dry, and easily broken, free from insects, burns with a clear flame, and is incapable of forming a dark-blue pulp when its powder is triturated with iodine and water. Ergot has been analyzed by various chemists; according to a recent investigation by M. Legrip, he found it to contain in 100 parts, 34.50 of a thick, fine yellow, very fluid, fixed oil; 2.75 of starch; 1.00 of albumen; 2.25 of inulin; 2.50 of gum; 1.25 of uncrystallizable sugar; 2.75 of a brown resin; 3.50 of fungin; 13.50 of vegeto-animal matter; 0.75 of osmazome; 0.50 of a fatty acid; 24.50 of lignin; 0.50 of coloring principles; an odorous principle not isolated; 2.25 of fungate of potassa; 0.50 of chloride of sodium; 0.50 of sulphate of lime and magnesia; 1.25 of subphosphate of lime; 0.25 of oxide of iron; 0.15 of silica; 2.50 of water, and 2.35 loss. H. L. Winckler gives as the most important chemical constituents, secaline in combination with ergotine, a red ferruginous coloring matter with a base yet to be eliminated, albumen soluble in water and in a coagulated condition, a large quantity of fatty oil, which in the normal grain appears to be replaced by amylon, fungous sugar, which disposes the watery extract of ergot of rye so strongly to fermentation, formiates, and phosphates. He considers the specific action of ergot ascribable to the secaline compound, or the coloring matter, or both of these compounds together and not to the fatty oil. A watery extract is, he states, the most active preparation, but it cannot be kept; a tincture, prepared with alcohol of 40 per cent., by several days' digestion at an ordinary temperature, from finely pulverized ergot, is of a dark-brown color, and contains all the active constituents of the ergot, with very little fatty oil, which separates in a crystalline form at very low temperatures. The spirituous extract is best kept and most effective when it is prepared by twice extracting the fine powder with an equal quantity of cold distilled water, clarifying the concentrated extract, and treating it with alcohol of 80 per cent. as long as a precipitate results on the addition of a fresh portion. The spirituous fluid is after twenty-four hours separated from the precipitate by filtration; the filtrate subjected to distillation in a water-bath, and the residue

evaporated to the consistence of an extract. Obtained in this way, the extractive ergotine is a little hygroscopic, has a light-brown color, a slight narcotic odor, dissolves under the separation of a little ergotine (*Wiggers*) in water, and evolves, when treated with a solution of caustic potassa, the penetrating odor of secaline in a high degree. By distillation of the concentrated watery extract with caustic lime, a very concentrated solution of secaline is also obtained. Winckler has found the compound of ergotine with secaline, *ergotinate of secaline* in the black sporous mass of *Lycoperdon Cervinum*.

Wiggers digested ergot in ether, and afterward in alcohol, evaporated the alcoholic solution, and treated the extract thus obtained with water, which left a reddish-brown powder, undissolved. Supposing this to be the active principle of ergot, he named it *Ergotin*; it possessed a peculiar nauseous odor, and a bitter, slightly acrid taste, and was soluble in alcohol, but insoluble in water or ether. Dr. Christison and Dr. Wright have not been able to obtain ergotin after the process of Wiggers. Winckler dried some recent ergot of rye at 139° F., pulverized it, and extracted first with ether, then with water. The aqueous solution was treated with strong alcohol, and separated from albuminous matter by filtration; the spirit was distilled off, and the residue brought to dryness. During this operation a small quantity of a brown powder, (*the Ergotine of Wiggers*,) was precipitated, which again dissolved in the concentrated liquid. The residue above, (*Winckler's Extractive Ergotine*,) dissolved readily in alcohol and water under the precipitation of a light-brown powder, (*the Ergotine of Wiggers*). It had a bitterish, cooling taste, and, when distilled with quicklime, afforded a distillate with the odor of herrings, containing propylamine or trimethylamine, but no ammonia. The residue consisted of a compound of secaline, (*a volatile base*,) with Wiggers' ergotine, which Winckler regards as an acid. The solution with ether, first extracted, contained a fatty oil, equal to 34 per cent. of the ergot. By treating ergot with alcohol acidified with sulphuric acid, he extracted a red ferruginous coloring matter.

The *Oil of Ergot*, introduced into practice by Dr. Wright, contains the active principle of ergot, and is very generally employed as a substitute for the crude article. It may be obtained by forming an ethereal tincture of ergot by the process of displacement, and evaporate by means of gentle heat. It is sometimes colorless, but generally reddish-brown, has a disagreeable, somewhat acrid taste, is lighter than water, and is soluble in alcohol, or alkaline solutions. Its effects are identical with those of ergot. When the oil is obtained by simple expression, it is destitute of the peculiar medicinal influences of that prepared by means of ether.

Ergot is *incompatible* with acetate and subacetate of lead, nitrate of silver, and tincture of galls. Iodine does not indicate starch in it. Its aqueous infusion is claret-colored, and has an acid reaction.

Properties and Uses.—The free and long-continued use of ergot, gives rise to very terrible and dangerous symptoms, even when no immediate effects are perceptible, as dry gangrene, typhus fever, or convulsions. In doses of from thirty to sixty grains, it often occasions nausea, vomiting, and in still larger doses, it causes a sense of pain and weight in the head, giddiness, dilated pupils, delirium and stupor. It reduces the frequency of the pulse, even without nausea. Medicinally, ergot is used on account of its power of promoting uterine contraction in languid natural labors. When thus employed, it produces a strong and continuous contraction and rigidity, without any alternation of contraction and relaxation, as observed in the natural process of labor; consequently, unless the os uteri and external parts are sufficiently soft and yielding, the constant pressure exerted upon the child, causes injury to it, and very often death. Its use should always be avoided, if possible, in first pregnancies. The conditions for safety and success are, that labor be somewhat advanced, the mouth of the womb moderately dilated, that no mechanical obstruction to delivery exists, from deformity of the pelvis, rigidity of the os uteri, mal-presentation, or disparity of the size of the child to the parts of the mother, and that the only cause of the slow progress of labor is insufficiency of the uterine contractions, in point of force or frequency. One or two drachms of the powder may be stirred in four fluidounces of hot water, and when sufficiently cool, may be given in tablespoonful doses every ten minutes, until labor-pains are induced; usually in fifteen or twenty minutes, the labor-pains increase in force and frequency, and gradually become continuous, and effect the expulsion of the child within an hour. Many objections are raised to its use, but, in general, if prudently administered, no bad effects will ensue. Dr. Catlett asserts that it will give rise to puerperal convulsions, hour-glass contraction of the uterus, and hydrocephalus in the new-born infant. It may also be given in cases where the fetus is dead, and circumstances require speedy delivery, as great exhaustion, or dangerous constitutional irritation. It may likewise be administered to facilitate abortion when it has once commenced, as well as to check uterine hemorrhage in the gravid or non-gravid state; it has likewise proved serviceable in hemorrhages from other organs, as the lungs, stomach, etc. It may likewise be given with advantage in retained placenta, as well as promoting the expulsion of a mole, hydatids, a clot of blood, or other uterine contents, when the womb has once begun to act. It is doubted by many whether it will excite uterine contractions in any instance, unless a natural movement toward such action has commenced. In small doses, it has been recommended in painful dysmenorrhea, where membranous shreds pass off. It has also been recommended in leucorrhœa, gleet, gonorrhœa, chronic diarrhea and dysentery, paraplegia, paralysis or debility of the bladder, and of the rectum, spermatorrhœa, hysteria, and intermittent fever. In these affections it may be given in

doses of from five to ten or fifteen grains three times a day; but its use should not be continued for a great length of time, on account of its tendency to cause dangerous symptoms.

The *Oil of Ergot* may likewise be used as an aid to parturition, and in uterine affections, in the place of ergot; it is equally effectual in doses varying from twenty to fifty drops, and which may be given in water, tea, or some aromatized syrup. In the dose of ten drops, it has been beneficially employed in diarrhea, and in gastric irritability and spasm; the dose may be repeated every three or four hours. Externally, the oil has been found serviceable as an anodyne in rheumatism, toothache, and as a styptic in hemorrhage from wounds; in this latter instance care must be employed in its application, as ergot has produced sloughing, when applied to abraded surfaces on the lower animals. The oil will retain its properties for several years, if kept in well-closed bottles in a cool place, and excluded from light; an elevated temperature or a prolonged exposure to the sun's rays diminishes its activity.

Rye flour, in the form of mush, is an excellent laxative article of diet, and may be given with much benefit in hemorrhoids and prolapsus ani, with accompanying constipation, mixed with molasses. In the dry state, rye flour has been found an excellent application to erysipelatous inflammations, and some other eruptive affections, allaying the burning and itching, and absorbing the irritating secretions. In the form of poultice, it is often applied to discuss tumors or swellings, or to hasten their suppuration when far advanced. Green rye, when from six to ten inches high, made into a salve by simmering in fresh cream, I have known to cure several most inveterate cases of *tinea-capitis*; to be applied to the scalp, twice a day.

Off. Prep.—*Extractum Ergotæ Fluidum*; *Infusum Ergotæ*; *Tinctura Ergotæ*; *Vinum Ergotæ*.

SELINUM PALUSTRE.

Marsh Smallage.

Nat. Ord.—*Apiaceæ*. *Sex. Syst.*—*Pentandria Digynia*.

THE ROOT.

Description.—This plant is the *Cnidium Palustre* of Sprengel, the *Peucedanum Montanum* of Koch, and the *Conioselinum* of Fischer. It has a simple, tapering, perennial root, with many long fibers. The stem is erect, four or five feet high, hollow, deeply furrowed, not hairy, branched and corymbose in the upper part, bright-purple at the base. The leaves are about five or six on the stem, alternate, remote, ternate with bipinnate divisions; the leaflets are opposite, deeply pinnatifid, dark-green, smooth, their segments linear-lanceolate, never quite linear, acute, entire, or trifid; the petioles are smooth, striated, dilated, and sheathing at the base, with a reddish membranous margin. Umbels large, horizon-

tal, of numerous, angular, general and partial rays. *General bracts* several, lanceolate, pointed, dependent, not half the length of the rays, their margins membranous and partly colored; *partial ones* similar, rather longer in proportion, and often confluent. *Flowers* white, numerous, uniform, with involute petals. *Fruit* very light straw color, four lines long, shining, obovate; the dorsal ridges very near each other, distinctly elevated, sharp, the lateral depressed and far within the broad thin margin; *vittæ of the commissure* subulate, straight, about half the length of the fruit.

History.—This plant grows in marshes and boggy meadows in the north and middle of Europe. The root abounds in a white fetid, bitter juice, which hardens into a brown acrid resin; it is the part employed. It imparts its properties to water or alcohol.

Properties and Uses.—Marsh Smallage is emmenagogue, diuretic, and antispasmodic, but abandoned as an internal remedy, on account of its caustic and dangerously poisonous properties. Ten or twenty grains, according to the patient's age, repeated every five hours, and after a time gradually augmented, have cured several cases of epilepsy; but it must not be used where abdominal obstructions exist, or where there is an exalted sensibility of the genital apparatus. In nervous and sanguine persons, especially those of irritable habits, it increases the violence of the disease. Two grain doses, repeated twice daily, have proved almost immediately beneficial in the convulsions of children during the process of dentition. The Marsh or Hemlock Parsley, *Selinum Canadense*, or *Cnidium Canadense* of Sprengel, and *Conioselinum Canadense* of Fischer, which grows in swamps, wet woods, and around the mouth of large rivers from Canada to Carolina, and westward, is a species of the above plant, and deserves a trial in the diseases just mentioned. It is a plant from two to four feet in height, somewhat resembling the *Conium Maculatum*, and having an angular, flexuous, hollow stem. The leaves are on large, inflated petioles, ternately divided; the divisions bipinnate, with linear-oblong, acute lobes. *Umbels* compound. *Petals* white, spreading. *Involucre* wanting, or two or three-leaved. *Styles* slender, diverging. *Fruit* about two lines long, oblong-oval. *Vittæ* solitary in the dorsal intervals, two or three in the lateral. It flowers in August and September.

SEMPERVIVUM TECTORUM.

Common Houseleek.

Nat. Ord.—Crassulaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE LEAVES.

Description.—Houseleek has a fibrous root crowned with several rosaceous tufts of numerous, oblong, acute, keeled, fringed, extremely

succulent *leaves*. The *stem* from the center of one of these tufts, is about a foot high, erect, round, downy, clothed with several, more narrow, sessile, alternate leaves, and terminating in a sort of many-flowered cyme, with spiked branches. *Flowers* large, pale rose-colored, without scent. *Segments of the calyx* twelve or more, with a similar number of *petals*, *stamens*, and *pistils*. *Offsets* spreading.

History.—This is a well known perennial plant, a native of Europe, where it is found growing on rocks, old walls, and the roofs of houses, flowering in August, and is remarkable for its tenacity of life. It sends out runners with axillary offsets by which it is propagated, and rarely flowers. It is sometimes cultivated as an ornament, or as a domestic medicine. The recent leaves are the parts used, they are from half an inch to two inches in length, thick, fleshy, succulent, flat on one side, somewhat convex on the other, smooth, of a light green color, inodorous, and of a cooling, slightly saline, astringent, and sourish taste; they contain a large proportion of supermalate of lime. The juice of the leaves filtered with an equal quantity of alcohol, forms a beautiful, white, highly volatile coagulum.

Properties and Uses.—The leaves of Houseleek are usually employed in the recent state, bruised, and applied as a cooling application to burns, stings of insects, ulcers, erysipelas, and other external inflammations. The leaf sliced in two, and the inner surface applied to warts or corns, and changed twice a day, will, it is said, positively cure them. The juice, applied locally, has cured ringworm, shingles, and many other cutaneous affections. Dr. A. Brown, of Cincinnati, recommends the following in many cases of deafness: fill a four or six ounce vial with the leaves of houseleek, cork it tightly, and place it within an unbaked loaf of bread. When the bread is baked remove the bottle, and there will be found a liquid of a soft, oily character, which may be dropped into the ear, say one or two drops, every night. When applied it produces a singular, stimulating sensation. In erysipelas, he has found much benefit from the free internal use of the leaves bruised in milk and water, in quantity sufficient merely to stain the liquid. The bruised leaves applied as a poultice, have, in his hands, cured severe cases of shingles in twenty-four hours. The leaves also possess an astringent property, which is beneficial in many cases.

SENECIO AUREUS.

Life Root.

Nat. Ord.—Asteraceæ; *Tribe*, Senecionideæ. *Sex. Syst.*—Syngenesia Superflua.

THE ROOT AND HERB.

Description.—This plant is known by several other names, as *Ragwort*, *False Valerian*, *Golden Senecio*, *Squaw-weed*, and *Female Regulator*.

It has an erect, smoothish, striate *stem*, one or two feet high, floccose-woolly when young, simple or branched above, terminating in a kind of umbellate, simple, or compound corymb. The *radical leaves* are simple and rounded, the larger mostly cordate, crenate-serrate, and long-petioled; the *lower cauline leaves* lyre-shaped; the *upper ones* few, slender, cut-pinnatifid, dentate, sessile or partly clasping, the terminal segments lanceolate. *Peduncles* subumbellate and thick upward. *Corymb* umbel-like. *Rays* from eight to twelve, four or five lines long, spreading. *Flowers* golden-yellow. *Scales* linear, acute, and purplish at the apex.

History. — This is an indigenous, perennial plant, growing on the banks of creeks and on low marshy grounds, throughout the northern and western part of the Union, flowering in May and June. The root and herb are the officinal parts, and the medicine is peculiar to Eclectics, not being known to other practitioners; it yields its properties to water or alcohol. It has not been analyzed. There are several varieties of this species, which possess similar medicinal virtues, as the *Senecio Balsamita*, or *Balsam Groundsel*, with the *stem* and *peduncles* villous at base; the *leaves* few, small and distant, pubescent; the radical ones oblong, spatulate, or lanceolate, sometimes cut-toothed, tapering into the petiole; cauline ones lyrate or pinnatifid; *flowers* subumbellate. This variety grows in pastures and on rocky hills.

Another, the *Senecio Gracilis*, *Unkum*, or *Female Regulator*, a slender state of the species, found on rocky shores; its *radical leaves* are orbicular, on long petioles, subcordate, crenate; cauline ones very few, remote, linear-oblong, dilated at the base, incisely dentate; *peduncles* very short, pilose, subumbelled; *involucre* smooth; *rays* few, very short. The *Senecio Obovatus* with the *radical leaves* obovate, crenate-serrate, petioled; cauline ones pinnatifid, toothed; *flowers* subumbelled long-peduncled, bracted, with a cavity under the receptacle like some other of the genus; *stem* somewhat glabrous. Found in meadows, etc.

Senecio Lanceolatus, found in shady cedar swamps in Vermont; it has all the *leaves* lanceolate-oblong, thin, sharply and unequally toothed, either wedge-shaped or somewhat cordate at the base, the upper cauline ones being pinnatifid-cut toward the base. Among these varieties, the *Senecio Gracilis* is considered the most efficient in uterine difficulties, and it is from this that the *Senecin* is prepared.

The whole herb is used. The root grows just below the surface of the ground, and runs along horizontally; it is from half an inch to six or eight inches in length, and about two lines in diameter, reddish or purplish externally, white-purplish internally, with an aromatic taste, and having scattered fibers. When dried, and mixed with the herb, it is found of various lengths from one-fourth of an inch to an inch or two, greenish-brown, or yellowish-brown externally, with very fine longitudinal

lines, a few fibers attached, short fracture, presenting under the microscope a shining, waxy surface, with a central pale-purple substance surrounded by a greenish-yellow one, with a light-yellowish ring between the two; it is inodorous, and has a faintly bitter, herbaceous, peculiar, resinous taste, with a very slight degree of pungency. It yields its properties best to alcohol.

Properties and Uses.—Life Root is diuretic, pectoral, diaphoretic, tonic, and exerts a peculiar influence upon the female reproductive organs, which has given to it, especially the *S. Gracilis*, the name of *Female Regulator*. It is very efficacious in promoting the menstrual flow; and may be given alone, in infusion, or combined with equal parts of asarum and savin, in amenorrhea not connected with some structural lesion. It will also be found valuable in dysmenorrhea. In menorrhagia, combined with cinnamon and raspberry leaves, it has been found very serviceable, when administered during the intermenstrual period, as well as at the time of ovulation. It has proved an excellent diuretic in gravel and other urinary affections, either alone, or given in combination with other diuretics; and is said to be a specific in strangury. In pulmonary and hepatic affections it has proved advantageous; and taken freely, the decoction has effected cures of dysentery. This is one of our valuable agents in the treatment of female diseases. Dose of the decoction, four fluidounces, three or four times a day.

Off. Prep.—Decoctum Senecii; Extractum Senecii Fluidum. Senecin.

SENECIN.

Senecin.

THE CONCENTRATED ACTIVE PRINCIPLE OF *SENECIO GRACILIS*.

Preparation.—Make a saturated tincture of the root and herb of *Senecio Gracilis*, add to it an equal quantity of water, and distil off the alcohol; the senecin remains in the water, which must be removed by filtration.

History.—Senecin thus prepared, is an oleo-resin of thick consistence, of a very dark-green color, appearing quite black in mass, having a peculiar, herbaceous odor, and a bitter, slightly pungent, persistent, and rather unpleasant taste. A portion of it, probably the oil, is soluble in alcohol, imparting a green color to the solution; on the addition of liquor potassa to the alcoholic solution, the senecin is rendered wholly soluble, and if muriatic acid be added in small quantity, it changes the green solution to greenish-white, without precipitation. It is entirely soluble in sulphuric ether, forming a greenish solution, which is not precipitated by water, nor acetic acid. It is insoluble in water, but becomes soluble on the addition of strong alkaline solutions.

The Franklin Institute of the city of New York, publish a preparation as *Senecin*, the active principle of *Senecio Gracilis*; they state that it is a whitish-brown powder, agreeable to the stomach, and pleasant to the taste. I have never seen the article, nor do I know how it is prepared, but from a specimen of their *Stillingin*, I am inclined to view it as the oleo-resin triturated with sugar, or sugar of milk. And if such be the case, it shows the necessity that exists, for practitioners to employ no secret agents, nor such as are prepared by secret processes, lest they be imposed upon in the article itself, as well as in the exorbitant price demanded for it.

Properties and Uses.—*Senecin* possesses the virtues of the plant from which it is obtained, in a high degree. It is, however, more especially employed in the treatment of female diseases, as amenorrhea, dysmenorrhea, and other uterine derangements. Combined with *aletrin*, *caulophyllin*, or *cimicifugin* it will be found especially useful in these complaints. In menorrhagia it may be combined with *geraniin* advantageously; or its ethereal tincture may be administered in some astringent infusion. A pill of *senecin*, *aletrin*, and sulphate of iron, will be found of benefit in chlorosis accompanied with amenorrhea. In dysmenorrhea it may be combined with extract of belladonna and sulphate of quinia. It is one of those agents which exert a tonic influence upon the uterus, thereby restoring its various functional derangements to a normal condition. Dose of *Senecin*, from three to five grains, three times a day.

SESAMUM INDICUM.

Benne.

Nat. Ord.—Pedaliaceæ, *Lindley*; *Bignoniæ*, *Jussieu*. *Sex. Syst.*—*Didynamia Angiospermia*.

THE LEAVES AND SEEDS.

Description.—*Sesamum Indicum* is an annual plant with an erect, pubescent, branching stem from two to four feet in height. The leaves are ovate-lanceolate, or oblong; the lower ones trilobed and sometimes ternate; the upper undivided, irregularly serrate and pointed. The flowers are of a reddish-white color, axillary, on short glandular pedicels. The fruit is an oblong, mucronate, pubescent capsule, containing numerous small, oval, yellowish seeds.

History.—There are two species of this genus, the *S. Indicum*, and the *S. Orientale*, both of which are natives of the East Indies, and are now extensively cultivated in many parts of Asia, Africa, West Indies, and in the Southern United States. That growing in the South is the *S. Indicum*, and flowers in August. Both the seeds and leaves are officinal. The first are small, yellowish, or in some cases blackish, of a

pleasant, mucilaginous taste, and yield by expression an excellent, bland, sweetish, inodorous, fixed oil, closely resembling olive oil, and which may be used as a substitute for it in all cases. Five pounds of the seeds afford about one pound of oil, which will keep several years without becoming rancid. The seeds are much employed by the negroes as an article of food; they parch them, and prepare them into puddings, broths, and various other ways. The leaves abound in a gummy matter, which they impart to water, forming a rich, bland mucilage.

Properties and Uses.—One or two fresh leaves, stirred in about half a pint of cool water, forms a bland and demulcent drink, very useful in catarrh, diarrhea, dysentery, summer-complaint, and irritation of the urinary organs. When the leaves are dried, hot water should be used. This mucilage likewise forms an excellent soothing application in ophthalmia, irritations and diseases of the skin, etc., but is not at all superior to that of slippery elm, or of sassafras pith. The oil may be used as an application to furfuraceous eruptions—or, in large doses, as a laxative. In India it is considered to possess emmenagogue properties, and capable of producing abortion.

SEVUM.

Suet.

THE PREPARED FAT OF OVIS ARIES.

History.—Suet, *Mutton Suet* or *Sheep Tallow*, is the fat of the domestic sheep, *ovis aries*. For medical purposes it is usually obtained from the fat around the kidneys, cut into pieces, melted with a moderate heat, and strained through linen or flannel. It is sometimes purified by boiling it in a little water, thus avoiding too great a heat. It is somewhat similar in its properties to lard, but is of a firmer consistence, and requires a higher temperature (103°) for its fusion than any other animal fat. When fresh and well prepared, it is white, inodorous, of a bland taste, sometimes brittle, insoluble in water, and nearly so in alcohol; when long kept it is apt to become yellow, rancid, and consequently unfit for pharmaceutical purposes. According to Chevreul, it consists of stearin, olein, and a small proportion of hircin; and its ultimate composition is Carbon 78.99, Hydrogen 11.70, Oxygen 9.30. *Hircin* is a liquid-like olein, but is more soluble in alcohol; by saponification it is convertible into *hirsic acid* and glycerin, and is therefore a *hircate of oxide of glyceryle*.

Mr. Wiggin, of Ipswich, has patented a mode for melting and purifying tallow and other kinds of grease. The process consists in heating the fatty substance in the state in which it is removed from the animal, with a small quantity of sulphuric acid of specific gravity 1.3 to 1.45. The acid dissolves the membrane and other impurities present, acquir-

ing a dark color and thick syrupy consistence, while the fat separates in a state of great purity. It has been suggested that the fats obtained by this process were probably the fatty acids resulting from the decomposition of the neutral fats by the oil of vitriol; but Mr. Wiggin replies that in using the sulphuric acid at the density indicated, no decomposition of the fats was effected, and that no sulphurous acid was evolved in the process.

Properties and Uses.—Suet is nutritive and emollient, but not so easy of digestion as the fat of the pig or ox; yet made into a broth, with or without aromatics, and used in diarrhea, dysentery, and general debility. It is sometimes used as a dressing to blisters, and may be applied to most of the purposes for which lard is used, on account of its superior hardness, and higher melting point. For forming an ointment, it will be found preferable to lard, especially when it is to be applied to several forms of cutaneous disease.

SILPHIUM PERFOLIATUM.

Indian Cup-plant.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Necessaria.

THE ROOT.

Description.—This plant, also known by the name of *Ragged Cup*, has a perennial, horizontal, pitted *rhizome*, beset with radicles, and a large, smooth, square herbaceous *stem*, from four to seven feet high, and often branched above. The *leaves* are opposite, connate-perfoliate, ovate, coarsely toothed, abruptly narrowed into winged petioles at the base, the upper pairs forming a cup-shaped disk with their connate bases; they are from eight to fourteen inches long, by four to seven wide. The *flowers* are terminal, with from fifteen to twenty-five oblong, lanceolate, yellow *rays*, and a large dark colored *disk*. *Heads* in a trichotomous cyme, the central on a long peduncle; *scales* ovate, obtuse, squarrose; *achenia* broadly ovate, winged, emarginate.

History.—This plant is common to the Western States, and is found growing in rich bottom or interval lands, bearing numerous yellow flowers in August. The root is the officinal part; it is large, long and crooked, and imparts its properties to water or alcohol. It has a persistent, acrid taste. There are several species of *Silphium*, which yield by exudation and incision a fine fragrant and bitterish gum like Frankincense, white or amber color, and which is chewed by the Indians to sweeten the breath.

Properties and Uses.—Cup-plant is tonic, diaphoretic, and alterative. A strong infusion of the root, made by long steeping, or an extract, is said to be one of the best remedies for the removal of aguecake, or enlarged spleen; it is also useful in intermittent and remittent fevers,

inward bruises, debility, ulcers, liver affections, and as a general alterative restorative. The gum is said to be stimulant and antispasmodic. The *S. Gummiferum*, or Rosin-weed, and *S. Laciniatum*, or Compass-weed, are said to be emetic in decoction. They have effected cures in intermittent fever, and are beneficial in dry, obstinate coughs. Said to cure the heaves in horses. The dose of the powdered root of *S. Perfoliatum* is twenty grains.

SIMARUBA OFFICINALIS.

Simaruba.

Nat. Ord.—Simarubaceæ. *Sex. Syst.*—Decandria Monogynia.

THE BARK OF THE ROOT.

Description.—Simaruba, called in Jamaica *Mountain Damson*, is a tree with long, horizontal, creeping *roots*, and a trunk about sixty feet in height, covered with a blackish, furrowed *bark*, and sending off alternate spreading branches, whose bark is smooth, gray, and marked with broad yellow spots. The *wood* is hard, white, and has scarcely any bitter taste. The *leaves* are alternate and abruptly pinnate, with a long, naked petiole, sometimes nearly fourteen inches long, to which the leaflets are attached by short footstalks. The *leaflets* are alternate, from two to nine on each side, about two inches long, obovate, entire, somewhat coriaceous, smooth, dark-green above, and whitish beneath. The *flowers* are of a yellowish-white color, and are disposed in long axillary panicles; some describe them as monœcious, others as diœcious; which last is said to be the case with the tree in Jamaica. The *calyx* is small, and divided into five obtuse, erect segments. The *petals* are stiff, lanceolate, equal, spreading, somewhat reflexed, and much longer than the calyx. The *stamens* are ten, equal, about as long as the corolla, bearing oblong, incumbent *anthers*, with a small hairy scale at the base. The *ovary* is ovate, five-parted, crowned with an erect, cylindrical style, bearing a five-lobed stigma, and surrounded at base with a ring of hairy scales. The *fruit* consists of five ovate, black, smooth, one-celled berries, all connected with a fleshy, pentagonal receptacle, and opening by a fissure when ripe, each containing a single, oblong seed.

History.—Simaruba is found in Jamaica, Guiana, and several parts of South America. Although placed in the class and order Decandria Monogynia of the Sexual System, it evidently is pentagynous; for although the styles are connected above, yet they are distinct below, are crowned with five connected stigmas, and spring from a five-lobed ovary. It prefers a sandy, arid soil, and flowers in November and December. The bark of the root is the officinal part. The root is rough, scaly, and warty, and its bark is intensely bitter. When dried, as met with in commerce, it is in pieces several feet in length, and some inches in breadth, folded lengthwise, light, flexible, tenacious, very fibrous, exter-

nally of a light brownish-yellow color, rough, warty, and marked with transverse ridges, and internally pale-yellow. It is inodorous, of a purely bitter taste, not easily pulverizable, and imparts its bitterness to water or alcohol. It is said to contain a bitter principle identical with quassin, resin, a volatile oil with the odor of benzoic acid, malic acid, traces of gallic acid, oxide of iron, silica, and several other unimportant ingredients.

Properties and Uses.—In large doses Simaruba is said to purge and vomit. In smaller doses it is tonic, and may be used in infusion in all cases where simple bitter tonics are indicated. It may be used in all cases as a substitute for quassia. It was at first introduced to the profession as a calmate astringent in chronic dysentery and diarrhea. However, it merely acts as a tonic, proving beneficial in relaxed and debilitated states of the alimentary canal, and would do harm, if used indiscriminately in dysentery. The infusion is the best form, two or three drachms of the bark being added to a pint of boiling water, the dose of which, as a tonic, is from half a fluidounce to two fluidounces.

Off. Prep.—Infusum Simarubæ.

SINAPIS ALBA.

White Mustard.

SINAPIS NIGRA.

Black Mustard.

Nat. Ord.—Brassicaceæ. *Sex. Syst.*—Tetradynamia Siliquosa.

THE SEEDS.

Description.—*Sinapis Alba* is an annual plant, with a thinly hirsute stem, from two to five feet high. The leaves are smoothish, lyrate pinnate, irregularly dentate, rugged, and pale-green; the lower lobes oblong and deeper, the terminal larger. The flowers are in racemes, with yellow petals, and linear, green, calycine leaflets. The siliques or pods are spreading, hispid, torose at the place of the seeds, ribbed, shorter than the compressed, ensiform beak, and about four-seeded. The seeds are globose, large, and pale.

SINAPIS NIGRA is also an annual plant, with a round, smooth, striate, branching stem from three to six feet high. The lower leaves are large, rough, variously lobed, and dentate; those higher on the stem more smooth and less lobed; and the uppermost are linear-lanceolate, entire, smooth, and pendulous; all are petiolate. The flowers are small, with yellowish, spreading calyx, and yellow, obovate petals, and stand closely together upon peduncles at the upper part of the branches. The pods are very numerous, nearly an inch long, bluntly quadrangular, nearly even and smooth, appressed close to the rachis of the raceme, tipped by a small, short, four-sided style, but wholly destitute of the ensiform

beak of the above species. *Seeds* numerous, small, globose, blackish-brown, veined.

History.—These plants are natives of Europe, and have been introduced into this country, where they are cultivated in gardens, and are found growing in old fields and waste places, flowering in June and July. The seeds of the *Black Mustard* are small, about the size of millet seed, globular, of a deep-brown color, slightly rugose on the surface, and internally yellow; when pulverized, they form a greenish-yellow powder, and have a faint smell when dry, but when mixed with water or vinegar, they have a peculiar, penetrating, diffusive odor, and a hot, bitterish, pungent, but not persistent taste. *White Mustard seeds* are nearly three times the size of the black, yellowish externally and in its substance, and of an odor and taste similar to the preceding, but more feeble; it affords a yellow powder, of a somewhat unctuous appearance, coalescing when compressed. Both kinds of mustard seed are employed in medicine, in the form of flour, and the white seeds are likewise used entire. Table mustard is prepared from the white seeds; but the finest quality is prepared with the purest flour of both the white and black, in nearly equal quantities. An English quality of table mustard is said to be prepared by mixing 145 pounds of mustard flour, made by grinding together two bushels of black and three of white seed, with fifty-six pounds of wheat flour, to diminish the pungency, and two pounds of turmeric to improve the color; then to restore the acrimony without the pungency, one pound of chilly pods, and half a pound of ginger, is added. The officinal flour of mustard should be made with the black and white seeds only, without any adulteration.

Upon pressure, both kinds of seed yield a fixed oil, thick like castor oil, of a greenish-yellow color, little smell, and a mild, not unpleasant taste, called *Oil of Mustard*, which yields upon saponification a peculiar acid, to which the name of *Erucic Acid* has been applied.

When black mustard seeds have been deprived of their fixed oil by pressure, a volatile oil is then obtained from them by distillation with water, called the *Volatile oil of mustard*; it contains sulphur, is colorless, or pale-yellow, heavier than water, of an exceedingly pungent odor, and an acrid, burning taste; it is slightly soluble in water, but readily so in alcohol or ether. It boils at about 298° , and when treated with alkaline solutions, forms sulphocyanurets; with an equivalent of ammonia, it forms a white, inodorous, crystalline compound, possessing many of the characters of an organic base, called *Thiosinamin*, $C_8 H_8 N_2 S_2$. The volatile oil consists of nitrogen, carbon, hydrogen, and sulphur; its formula is $C_8 H_8 NS_2$, and its specific gravity 1.010. Dr. Will considers it a sulphocyanuret of allyle $C_6 H_5 + C_2 NS_2$. It is the active principle of black mustard seeds.

Black mustard seed contains two peculiar principles, *Myronic Acid*, in the state of *Myronate of potassa*, and *Myrosyne*, an indifferent nitrogenized

body, analogous in character to the *emulsin* of almonds. When the seeds are bruised and macerated in water, the myrosyne, acting the part of a ferment, causes a reaction between the water and myronate of potassa, which results in the production of the volatile oil. The same thing happens when any one of the myronates is brought into contact with water, and the essential fermenting principle, myrosyne. As with emulsin, when coagulated by heat, alcohol, or acids, the myrosyne becomes inert, and no volatile oil is obtained.

Myronate of potassa may be obtained by pulverizing black mustard seeds, drying the powder at a temperature of 212° , and then depriving it of its fixed oil by pressure. The powder is then to be treated with strong alcohol in a displacement apparatus, and when nearly exhausted of everything soluble in this liquid, it is to be again pressed, and then treated with water. The aqueous solution must next be evaporated, adding weak alcohol before it is too much concentrated, which precipitates a glutinous matter. The solution then being filtered, and carefully evaporated, deposits crystals of myronate of potassa, which may be obtained very pure and white by washing the mass with diluted alcohol. It is unalterable in the air, very soluble in water, insoluble in pure alcohol, and of a bitter taste.

Myronic acid may be obtained by adding to a solution of one hundred parts of myronate of potassa, thirty-eight parts of crystallized tartaric acid, concentrating the solution by evaporation, and then adding weak alcohol, which precipitates the bitartrate of potassa, and retains the myronic acid in solution. It is a fixed, inodorous substance, of a bitter and sour taste, and an acid reaction. When obtained separate from its bases, it forms a colorless solution, which, by evaporation becomes thick, like molasses, without crystallizing. It is soluble in water or alcohol, but not in ether; and forms soluble salts with the alkalis, baryta, lime, and the oxides of lead and silver, all of which yield volatile oil of mustard, when mixed with an aqueous solution of myrosyne. It contains sulphur, nitrogen, carbon, hydrogen, and oxygen.

White mustard seeds contain myrosyne but no myronate of potassa, and consequently no volatile oil can be obtained from them; yet if they be added to black mustard seeds in which the myrosyne has been coagulated, the volatile oil will be generated on the application of water and distillation. Although no volatile oil is had from white mustard seed, yet upon the addition of water, a fatty acrid principle is developed, which renders these seeds applicable to the same purposes as the black variety. This acrid principle is the result of the reaction of water upon *sulpho-sinapisin*, a principle found in the seed, and which is accomplished through the presence and influence of myrosyne; for if this be absent, or coagulated by heat, alcohol, etc., no change takes place. Boutron and Frémy state that with the development of the fixed, fatty, inodorous, acrid

principle, hydrosulphocyanic acid is also produced. White mustard seeds contain more fixed oil than the black.

Sulpho-sinapisin may be obtained by freeing white mustard seeds of their fixed oil by expression, then boiling them in water, evaporating the decoction to the consistence of honey, mixing the residue with six or eight times its volume of anhydrous alcohol, which precipitates various substances, then distilling off the alcohol, and setting the syrupy residue aside, to crystallize. The crystals may be purified by repeated solution in alcohol and crystallization. It is white, crystallizable, inodorous, bitter, and soluble in alcohol or water, forming yellow solutions. It is neutral, and consists of sulphur, nitrogen, carbon, hydrogen, and oxygen.

Myrosyne may be procured by treating white mustard seed with cold water, filtering the solution, evaporating it by a heat not exceeding 100°, and when it is of the consistence of syrup, carefully adding alcohol, which causes a precipitate easily separable by decantation. If this precipitate be dissolved in water, and the solution cautiously evaporated as before, myrosyne, not entirely pure, is obtained. When dry, it has the character of an albuminous substance, is soluble in water, forming a viscid solution which froths when agitated, and is coagulated and rendered inert by heat, alcohol, and the acids. Though closely analogous to emulsin, yet it is a distinct principle, as its place cannot be supplied by emulsin with the same results, and which is supposed by Simon to be owing to the absence of sulphur in the latter article.

Simon obtained a peculiar principle by the following process, and which he called *Sinapisin*: He exhausted black mustard seeds with strong alcohol, distilled off the greater part of the alcohol, treated the residue several times with four or five times its weight of ether, distilled off all the ether from the ethereal solutions, treated the extract again with a smaller quantity of ether so as to leave behind insoluble substances, and repeated this process until the extract formed a perfectly clear solution without residue. The extract was then dissolved in cold strong alcohol, and the solution, having been decolorized with animal charcoal, was allowed to evaporate in the air. Fifty-five pounds of the seeds yielded only eighty grains of crystallized Sinapisin. It was in brilliant, white, scaly crystals, sublimable by heat, soluble in alcohol, ether, or the fixed and volatile oils, but insoluble in acids and alkalies. Upon contact with water and myrosyne, it emitted the odor of the oil of mustard.

From the above statements, it will be perceived, that water at common temperatures is the best vehicle for mustard, whether for internal or external use; and that boiling, or uniting it with alcohol or acids, must impair its active properties.

Properties and Uses.—Mustard is an irritant, stimulant, rubefacient, vesicant, and diuretic. It is used in small quantities, internally, as a

condiment, and safe stimulant of the digestive organs. In large doses it is a good emetic, and may be used in cases of torpor of the stomach, poisoning by narcotics, to rouse gastric susceptibility, and also to facilitate the action of other emetics. In inordinate doses it is poisonous, producing gastro-enteritis, and perverting the vital processes by its absorption into the system, as known by the horse-radish smell of the urine, and the mustard odor in the blood. Externally, it quickly excites redness of the skin, and if too long applied, inflammation, ulceration, and even sloughing; but if removed in time, the redness is succeeded only by induration of the cuticle, and occasionally desquamation. The stinging pain which remains after the removal of the mustard, may be mitigated by sponging the part with cold water, or dropping ether on it. Sinapisms are beneficially applied over the abdomen and spine, in gastric and enteritic inflammations, and over the epigastrium, in vomiting from irritability of the stomach; also to the spine, wrists and ankles, to arouse the system in apoplectic and comatose conditions, and in typhus fever; to the feet and legs, for pains in the head during fevers and other diseases, and in determinations to the head; and to various parts for removing pain, mitigating local inflammations, or arousing from stupor. In the treatment of cholera, mustard is an excellent rubefacient application, likewise in dyspepsia and obstinate constipation. Applied to the breasts it will often relieve suppression of the menses, as well as menorrhagia; to be applied intermittingly. In no case should a sinapism be continued too long, as vesication and ulceration followed by sphacelus, may result. The *volatile oil of mustard*, is a powerful rubefacient and vesicatory; and in the dose of two drops, several times a day, in some mucilaginous vehicle, it is a good diuretic, useful in dropsy, and has been serviceable in colic. A liniment composed of one part of the oil, dissolved in sixteen parts of alcohol, or in ten parts of olive or almond oil, is a good substitute for a sinapism. White mustard seeds, taken entire, were formerly used as a favorite tonic in dyspepsia. Dose of mustard, as an emetic, one, two or three drachms, with six or eight ounces of warm water.

Off. Prep.—Cataplasma Sinapis.

SISYMBRIUM OFFICINALE. (*Erysimum Officinale.*)

Hedge Mustard.

Nat. Ord.—Cruciferae. *Sex. Syst.*—Tetradynamia Siliquosa.

THE SEEDS AND HERB.

Description.—This is an annual, herbaceous plant, with a round more or less hairy, branching stem, from one to three feet high. The leaves are runcinate; the lower ones from three to eight inches long by one to three wide, the lower segments placed at right angles to the midvein, or

pointing backward, the terminal segment largest; upper ones in three lanceolate segments placed at right angles. The *flowers* are small, yellow, and terminate the slender, virgate *raceme*, which becomes one or two feet long. The *siliques* or *Pods* are subulate, erect, sessile, and closely appressed to the rachis. *Seeds* in a single row in each cell, ovoid, marginless.

History.—This is an unsightly weed growing in the United States and Europe, along the roadsides, by walls and hedges, and on heaps of rubbish, flowering from May to September. The whole plant is employed; it has a herbaceous, acrid taste, somewhat resembling mustard. The seeds have considerable pungency. Water extracts the active properties.

Properties and Uses.—Diuretic and expectorant; recommended in chronic coughs, hoarseness, ulceration of the mouth and fauces, asthma, and urinary obstructions. The juice of the plant may be mixed with honey, or the seeds may be taken in substance. The *Sisymbrium Sophia*, or Flixweed, of a biting acrid taste, and pungent odor when rubbed, has been used externally in indolent ulcers, and the seeds internally in worms, calculous complaints, etc. Its *leaves* are bipinnately divided, the lobes oblong-linear, incised; *pedicels* four times the length of the calyx; *petals* smaller than the sepals.

SMILAX OFFICINALIS.

Sarsaparilla.

Nat. Ord.—Smilacæ. *Sex. Syst.*—Dioecia Hexandria.

THE ROOT.

Description.—*Smilax Officinalis* has a twining, angular, prickly, and shrubby *stem*; the young shoots being unarmed. The *leaves* are ovate-oblong, acute, cordate, netted, five or seven-nerved, coriaceous, smooth, a foot long, and four or five inches broad; the young ones lanceolate, oblong, acuminate, and tri-nerved. The *petioles* are an inch long, smooth, bearing tendrils above the base. *Flowers* unknown. The natives on the banks of the Magdalena river, in New Grenada, call this plant *Zarzaparilla*, and send great quantities of it down the river to Carthagena and Mompox, from whence it is shipped for Jamaica and Cadiz. Pereira supposes this to be the *Jamaica Sarsaparilla*, the best and most valuable kind in commerce. It is not known, however, by this name in the United States, and differs from the Honduras sarsaparilla in the reddish color of its epidermis, and in containing less starch, and yielding a greater proportion of extract. It is usually had in bundles a foot or a foot and a half in length, by four or five inches in thickness, consisting of long slender roots folded up, with numerous radical fibers attached.

SMILAX SYPHILITICA has a round, smooth *stem*, furnished only at the joints with from two to four short, thick, straight prickles. The *leaves*

are a foot long, oblong-lanceolate, acuminate, shining, coriaceous, three-nerved, and terminated by a long point. This plant has been seen growing upon the banks of the river Cassiquiare in New Grenada, and in Brazil at Yupura, and near the Rio Negro. Pereira supposes it to yield the *Lisbon* or *Brazilian Sarsaparilla*, which is imported from Para and Maranham, in cylindrical bundles, from three to five feet long, and about a foot in thickness; it is bound by close circular turns of a very flexible stem, and consist of unfolded roots, without rhizoma and stems, and with but few radical fibers. It has an amylaceous interior structure, with considerable acrimony. It is considered as a valuable variety of the drug. According to Richard it has been ascertained to be the product of the *S. Papyracea* of Poiret, instead of *S. Syphilitica*.

SMILAX PAPYRACEA is an under shrub with a compressed *stem* angular below, and furnished with spines at the angles. The *leaves* are elliptical, acuminate, and three-nerved. It inhabits Brazil, on the banks of the Amazon and its tributaries, and is thought to furnish the Brazilian Sarsaparilla.

SMILAX MEDICA has an angular *stem*, armed with straight prickles at the joints, and a few hooked ones in the intervals. The *leaves* are of the texture of paper, smooth, bright-green on both sides, cordate, auriculate, shortly acuminate, five-nerved, with the veins of the under-side prominent; they vary much in form, being ovate, somewhat panduriform, auriculate, and somewhat hastate, with the lobes of the base obtuse, sometimes obsolete, sometimes divaricating; their edge not straight, but as if irregularly crenate; *petioles* and *midrib* armed, when old, with straight, subulate prickles. *Peduncles* smooth, axillary, varying in length from three lines to an inch or more. *Umbel* about twelve-flowered, with the pedicels about three lines long. Schiede found this plant on the east slope of the Mexican Andes, where the root is collected and then carried to Vera Cruz; it is supposed to furnish the Vera Cruz Sarsaparilla of commerce. This is imported from Vera Cruz and Tampico, in large, loose bales of about two hundred pounds each, bound with cord or leather thongs, and usually holding the roots folded upon themselves, and separately packed. These consist of a caudex, with numerous long radicles, smaller than in the Honduras variety, and having a thinner bark. They are frequently soiled with earth. Although not much esteemed, it possesses considerable acidity, and is, probably, not inferior to any of the other kinds.

SMILAX SARSAPARILLA has a long, slender, shrubby, slightly four-angled *stem*, aculeate above. The *leaves* are unarmed, ovate, lanceolate, cuspidate, abruptly contracted at each end, with three strong veins, and two lateral smaller secondary ones, glaucous beneath, two or three inches in diameter, and supported alternately upon short, margined *petioles* with two long tendrils at their bases. The *flowers* are in small,

thin umbels, yellowish-white, usually three or four together, upon a common peduncle which is longer than the petioles. The *berries* are three-seeded, red according to *Woodville*, black, to *Pursh*. This species is indigenous, growing in swamps and hedges in the Middle and Southern States. It does not furnish any of the sarsaparilla of commerce, and is supposed to be destitute of any active medicinal properties, but on what grounds I do not know. There is a plant in the South extensively known as *Bamboo Brier*, the root of which I have much used in practice, and with decidedly more successful results than from the use of any of the Sarsaparillas of the shops—from the description of the plant, given to me by those who have seen it growing, I am inclined to believe it is one of the species of Sarsaparilla, probably *S. Sarsaparilla*, and I invite the attention of Eclectics to it, as a remedy in every respect superior to the usual commercial article, especially in primary and secondary syphilitic diseases.

SMILAX CHINA has a hard, large, knotty, uneven *rhizoma*, brown or blackish internally, whitish within. The *stem* is tapering, slightly prickly, growing two or three feet high without support, but acquiring a greater length if scrambling among bushes. The *leaves* are thin, membranous, roundish, five-nerved, acute or obtuse at each end, and mucronate at the point; the *stipules* are distinct, obtuse. *Umbels* small, ten-flowered, greenish-yellow. *Fruit* red, about the size of a *bird cherry*. This is a native of China and Japan, and has been employed under the name of *China root* as a substitute for the officinal Sarsaparilla. As found in the shops, it is in pieces from two to ten inches long, an inch or two in diameter, somewhat compressed, more or less knotty, often branched, brownish or grayish-brown externally, whitish or light flesh color internally, inodorous, of an insipid taste at first, but succeeded by a slight bitterness and acidity, similar to that of sarsaparilla.

History.—All of the Sarsaparilla plants are climbing or trailing plants, with prickly stems; there are many species of them, some of which are destitute of any useful medicinal power. *Hancock*, among six or eight species growing in the woods of Guiana, found only one possessing any degree of medicinal activity. There are several varieties of the drug sarsaparilla in commerce, but from our present imperfect knowledge on the subject, we cannot determine with certainty the species which afford them. Those growing in Mexico and South America, have long and slender roots, originating in great numbers from a common head or rhizoma, from which arise the stems of the plant. The whole root is usually dug up, with the rhizoma attached. Beside the varieties of this drug, heretofore referred to, there are one or two others, viz; the *Caracas Sarsaparilla* from La Guayra. It comes in oblong packages of about one hundred pounds, surrounded with broad strips of hide, which are connected laterally with thongs of the same material, and leave much of the root exposed. The roots are separately and carefully packed.

Honduras Sarsaparilla is the variety most esteemed and more commonly employed in this country. It comes from the bay of Honduras, and is in bundles two or three feet long, composed of several roots folded lengthwise, and compactly secured by a few circular turns. These are packed in bales of a hundred pounds or more, and are imperfectly covered with skins. Externally the roots are of a dirty-grayish color, frequently reddish-brown, the epidermis is thin, inner bark thick, and the root is brittle, and so amylaceous when broken, that a fine white dust is easily driven out by rubbing it. Its botanical source is not accurately known. There are some other varieties of an inferior sort, which it is unnecessary to notice.

The sarsaparilla of commerce is composed of roots of several feet in length, as thick or thicker than a goosequill, cylindrical, more or less wrinkled longitudinally, flexible, having a thick bark externally, covered with a thin, easily separable epidermis, an inner layer of ligneous fiber, and a central pith. The epidermis varies in color, but is mostly grayish, or reddish-brown, and occasionally very dark; the bark also varies in color, being whitish, brown, pink, and occasionally white, brittle, and pulverulent. The ligneous portion is thin, and is composed of longitudinal fibers, which allow the whole root to be readily split through its whole length. The central medulla often abounds in starch. The root is very faintly odorous, except when boiled in water, which gives a decided and peculiar odor. Its taste is at first mucilaginous, but which gradually becomes slightly bitter and disagreeably and persistently acrid. Water, either cold or hot, readily extracts its virtues, which are, however, much impaired by long boiling; diluted alcohol may also be used as a menstruum. According to Hancock, water does not take up all the active principle. In speaking of the Para and Rio Negro Sarsaparilla, he states: "After exhausting half a pound of this sort by two digestions, boiling and pressure, I added to the dregs half a pint of proof spirit, and digested this with a gentle heat for a few hours in a close vessel, then affusing hot water to the amount of that taken off from the first boiling, and pressing again, I procured by the last operation about four pints of an infusion which possessed the acrid properties of the sarsa in a much higher degree even than that obtained by the first decoction with simple water." There is no doubt, that alcohol added to infusions of the root, will increase their medicinal power, in consequence of its superior efficacy as a solvent. According to analysis, sarsaparilla contains a peculiar crystalline substance, a coloring matter, resin, starch, lignin, a thick, aromatic, fixed oil, a waxy substance, chloride of potassium, and nitrate of potassa. Also said to contain a minute proportion of volatile oil, gum, bassorin, albumen, gluten, gliadine, lactic and acetic acids, and various salts.

The crystalline substance found in Sarsaparilla is supposed to be its active principle, and has been variously named by chemists. Palota,

its first discoverer in 1824, named it *Pariglin*; M. Folchi, supposing he had subsequently discovered a new principle, called it *Smilacin*. M. Thubeuf, in 1831, announced it as another newly-discovered principle under the name of *Salseparin*; and in 1833 M. Batka, from a similar supposition, gave an account of it as *Parillinic acid*, under an impression that it contained acid properties. In 1834, M. Poggiale proved that all these substances are identical, though procured by different processes. If it is the active principle of sarsaparilla it should be named *Sarsaparillin*. The best process for obtaining it, is that of M. Thubeuf, as follows: Treat the bruised root with hot alcohol, until it is deprived of taste, distil the tincture and draw off seven-eighths of the alcohol; treat the remainder with animal charcoal, and at the end of twenty-four or forty-eight hours, filter. The sarsaparillin will be deposited in the form of a granular powder. This must be dissolved in a fresh portion of alcohol and crystallized. The alcoholic mother liquors may be deprived of that portion of this principle which they retain, by evaporating to dryness, dissolving the product in water, filtering, again evaporating to dryness, redissolving in alcohol, and crystallizing. *Sarsaparillin* is white, inodorous, neutral, almost tasteless in the solid state, but of a bitter, acrid, nauseous taste, when dissolved in alcohol or water. It is sparingly soluble in cold water, but more readily in boiling water, which deposits it on cooling. Boiling alcohol also dissolves it more readily than cold; and it is likewise soluble in ether and the volatile oils. The aqueous solution froths very much when agitated. It is found in the greatest abundance in the bark of the root. In doses of from two to thirteen grains, it has been found to produce nausea, and diminish the force of the circulation. M. Beral procured it pure, by preparing a tincture of the root with very dilute alcohol, and distilling by means of a salt-water bath. It is, therefore, volatile, and this explains the cause of the inefficiency of a long boiled decoction of sarsaparilla.

Sarsaparilla should never be purchased, unless it leaves a decidedly acrid impression on the mouth and fauces, after having been chewed for a short time; without this effect, it cannot be relied upon as an efficient article.

Properties and Uses. — Sarsaparilla is generally considered as an alterative, though stated by some to possess diuretic, diaphoretic, and emetic properties. Its mode of action, however, is not well understood, as it effects normal changes in the system without any apparent influence over any of the functions. No medicine has, probably, ever passed through so many changes of reputation, having been at various times most highly lauded as an efficient alterative, and as often been pronounced inert. There is no doubt, however, that when properly prepared, it exerts a favorable influence over the system. The diseases in which it has been more particularly recommended, are inveterate

syphilis, pseudo-syphilis, mercurio-syphilis, and struma in all its forms. It has also been advised in chronic rheumatism, chronic cutaneous diseases, passive general dropsy, gonorrheal neuralgia, and other depraved conditions of the system, where an alterative is required. A beer is made in South America, which enjoys much reputation there as an alterative beverage; it is made of Rio Negro Sarsaparilla one pound, raspings of guaiac wood six ounces, aniseed and bruised liquorice root, of each two ounces, mezereon root-bark one ounce, molasses one pound, and half a dozen bruised cloves; pour upon these articles two gallons of boiling water, and shake the vessel three times a day. As soon as fermentation has well begun, it may be taken in doses of four fluidounces two or three times a day. At the present day, sarsaparilla is but little used by Eclectics; the *Stillingia Sylvatica* being found greatly superior to it in medicinal efficacy, is employed in preference. Dose of sarsaparilla in powder, thirty grains, three or four times a day; of the infusion or syrup, four fluidounces.

Off. Prep.—Decoctum Sarsaparillæ; Extractum Sarsaparillæ Fluidum; Infusum Sarsaparillæ; Syrupus Sarsaparillæ Compositus.

SODIUM.

Sodium.

History.—Sodium was discovered by Sir H. Davy in 1807, while decomposing soda by means of galvanism. It was subsequently obtained in large quantities by Gay-Lussac and Thenard by means of iron turnings heated to whiteness; these coming in contact, the iron became oxidized, and sodium was liberated. The process of Schœdler is the most economical, as well as the most generally employed at the present day for procuring it—it is as follows: the commercial acetate of soda, is converted by ignition into carbonate and charcoal, which is heated in an iron-mercury bottle to whiteness, having had an additional portion of charcoal mixed with it; the process is similar to that for obtaining potassium, which see. Sodium is the metallic radical of the alkali soda. It is a soft, sectile, silver-white metal, having a very high luster, but becoming quickly tarnished and oxidized when exposed to the air, from which it rapidly absorbs oxygen, and must therefore be kept under naphtha. Its specific gravity is 0.97, it melts at 200°, its equivalent number is 23.3, and symbol Na. It fuses into a globule, when thrown upon cold water, and rapidly traverses the surface in all directions, liberating hydrogen, and generating a solution of soda, thus instantly decomposing the water. When exposed to the air, sodium forms the protoxide, or the alkali soda, which is the only important oxide, on account of its numerous salts.

Sodium constitutes two-fifths of all the sea-salt existing in salt water, in the water of springs, rivers, and lakes in almost all soils, and in the form of rock-salt. Sea-salt is a compound of sodium with chlorine,

Na. Cl. It is also contained in many minerals, sea-plants, and in most animal fluids. Sodium and the salts of the protoxide burn with a more or less rich yellow-colored flame.

The medicinal salts of soda are chloride of sodium, solutions of soda and chlorinated soda, the acetate, borate, carbonate, bicarbonate, phosphate, sulphate and valerianate of soda, and the tartrate of potassa and soda, each of which will be described under its appropriate head in the second part of this work.

SODÆ ACETAS.

Acetate of Soda.

History.—Acetate of Soda, formerly called *Crystallized Foliated Earth of Tartar*, was first obtained in 1767 by Meyer. At present, it is prepared on a large scale by the manufacturer of pyroligneous acid, for the purpose of obtaining acetic acid by the action of sulphuric acid. The impure pyroligneous acid is neutralized with lime, forming an acetate of lime; this is treated with a strong solution of sulphate of soda, which by double decomposition produces a deposit of sulphate of lime, and acetate of soda in solution, which last is filtered and crystallized; the crystals may be further purified by melting and re-crystallizing them. It may also be obtained by the following process of the Dublin College: Take of Crystallized Carbonate of Soda of commerce *one pound* (avoirdupois), or *a sufficient quantity*; Acetic Acid of commerce, sp. gr. 1.044, *one pint* (Imperial measure). To the Acid, placed in a porcelain capsule, add by degrees the Carbonate of Soda, and, taking care that there shall be a slight excess of Acid, evaporate the resulting solution until a pellicle begins to form on its surface, and set it by to crystallize. The crystals, when drained of the mother liquor, and dried by a short exposure to air on a porous brick, should be inclosed in a well-closed bottle.

Acetate of Soda is a white salt, in amorphous foliated masses of interlaced crystals, or crystallized in long striated needles and oblique rhombic prisms variously modified. It is permanent in ordinary air, but slowly effloresces in a dry atmosphere, losing about forty per cent. of its weight; its taste is cooling, saline, bitterish, but not disagreeable. It requires about three parts of temperate water to dissolve it, and about twenty-four parts of alcohol. It dissolves in less than its own weight of water at 212°. A temperature of 550°, cautiously managed, drives off its water of crystallization, without the loss of any acid; but at 600° the acetic acid is decomposed, and a mixture of carbonate of soda and charcoal is left. Sulphuric acid decomposes it, setting free the acetic acid, which may be known by its peculiar acetous odor, and forming a sulphate of soda. A solution of acetate of soda is not acted on by chloride of platinum, which will serve to distinguish it from a salt of potassa. Acetate of soda should be perfectly neutral to test-paper. It consists of one equivalent of acid 51.48, one of soda 31.3, and six of water 54=136.78.

Properties and Uses.—Acetate of soda is a mild diuretic, and possesses similar properties with the acetate of potassa. As a diuretic, its dose is from a scruple to two drachms.

SODÆ BORAS.

Borate of Soda. Borax.

History.—Borax exists in a native state in several parts of the world, but more abundantly in the water of various lakes of Persia and Thibet, on the margins of which it is left in impure crystals during the dry season, and is gathered in lumps, called *Tincal* or *Crude Borax*. It is also met with in the mines of Potosi; and is largely manufactured by the direct combination of boracic acid with soda. The crude borax or tincal comes from Thibet and various parts of Asia by the way of Calcutta, of which there are three varieties, viz: Indian Tincal, which is met with in small crystals; Bengal or Chandenagor Tincal, which is in large, well-defined, hexædral prismatic crystals; and Chinese Tincal, which is imported in crusts and masses, and is partially refined. The tincal met with in commerce is in crystalline masses, of a grayish, greenish, or yellowish color, opaque, of a waxy luster, covered either with an argillaceous, or soapy substance, of a soapy odor, and greasy to the touch. Before being employed in medicine or in the arts, the various kinds of tincal require purifying.

The mode of purifying crude borax was for many years known only to the Dutch and Venetians, who contrived to keep the process a secret; but in 1818 Robiquet and Marchand made known a process which is now generally adopted by refiners. It consists in placing the tincal in a large wooden vessel, covering it with water to the depth of four or five inches, and allowing it to remain thus, with occasional agitation, for six or seven hours; slaked lime is now added in the proportion of one part to four hundred of tincal, this is thoroughly mixed with the impure salt, and is then allowed to remain for twenty-four hours. The lime forms with the soapy matter an insoluble calcareous soap, and at the same time removes sulphate of soda, and chloride of sodium. The crude borax thus acted upon, is crumbled between the hands, and placed upon a sieve to drain; after the draining, it is dissolved in two and a half times its weight of water, by the aid of heat, and in order to separate any remains of the soapy matter, about one-fiftieth of its weight of chloride of calcium is added to the solution, after which it is strained. The solution is then concentrated by evaporation, and run into wooden vessels of an inverted quadrangular pyramidal shape, which are lined with lead, and by allowing it to cool very slowly, distinct crystals of refined Borax are obtained; if the cooling takes place rapidly, crystalline crusts only will be furnished.

At the present day, large quantities of borax are made artificially by the combination of boracic acid with soda. Boracic acid is obtained in great abundance from certain lagoons and hot springs in Tuscany, which are stated to furnish about three millions of pounds annually. It is impure when first obtained, containing in 100 parts 76.5 crystallized boracic acid, 8.5 sulphate of ammonia, 2.6 sulphate of magnesia, 5.0 sulphate of lime, 1.2 silica, 1.3 sulphuric acid, 6.6 water, beside various other impurities. Borax is prepared by saturating a solution of carbonate of soda with boracic acid, then evaporating and crystallizing, or by saturating caustic soda with boracic acid; the impurities existing in the acid are removed, after the biborate has been formed, by various processes. Borax crystallizes in large, oblique, rhombic prisms, or in flattened, six or eight-sided prisms, usually terminated by two or four converging planes; it is white, translucent, shining, inodorous, and possessed of a peculiar sweetish, slightly saline and somewhat alkaline taste. It has an alkaline reaction. It slowly effloresces when exposed to the air, its surface becoming covered with a white powder. It dissolves in twelve parts of cold, and two of boiling water; sulphuric acid added to a hot concentrated solution, causes a precipitate of white, pearly, scaly crystals of boracic acid, which, added to alcohol, impart a green color to its flame while burning. The sulphate of soda remains in solution. At a moderate heat, borax fuses in its water of crystallization, swells considerably, and ultimately becomes an anhydrous salt, having lost about half its weight. Above a red heat it fuses again into a liquid, which on cooling, concretes into a solid, transparent mass, called *Glass of Borax*, which is much used as a flux in assays with the blowpipe. When two parts of borax, and six parts of bitartrate of potassa, are boiled for five minutes, in sixteen parts of water, the solution filtered when cool, and then evaporated, a gummy mass is obtained, called *Soluble Cream of Tartar*; this is soluble in its own weight of cold, and half its weight of boiling water. Boracic acid renders the bitartrate of potassa still more soluble in water, than borax; four parts of the bitartrate and one of acid, boiled in twenty-four parts of water, and the solution evaporated, will likewise form soluble cream of tartar, the exact character of which is not satisfactorily known. Boracic acid is composed of one equivalent of boron 10.9, and three of oxygen $24=34.9$ (BO_3). Borax consists of two equivalents of boracic acid 69.8, one of soda 31.3, and ten of water $90=191.1$ ($2\text{BO}_3 + \text{NaO} + 10\text{Aq}$). The boracic acid is so feeble an acid that even the two equivalents of it in borax do not fully neutralize the soda, so that borax is an alkaline salt. A variety of borax occurs containing only five equivalents of water; it crystallizes in octahedrons, is harder than common borax, and does not effloresce. It may be obtained by crystallizing a boiling solution of borax, at a temperature between 132° and 174° . Borax is not subject to adulteration.

Properties and Uses.—The medicinal actions of borax are but imperfectly known. It is supposed to be a diuretic, refrigerant, antilithic, emmenagogue, and aphrodisiac. It has been found an excellent remedy in nephritic and calculous complaints, depending upon an excess of uric or lithic acid; the dose is from thirty to forty grains. It is rarely used as a parturient agent, yet there is no doubt that it exerts an action on the uterus. It has been successfully used in amenorrhea, dysmenorrhea, and to facilitate parturition, or favor the expulsion of the placenta. In such instances it has been used alone, or combined with other agents as ergot, blue cohosh, cinnamon, etc. Ten grains given for a dose, and repeated three or four times a day for several days, have produced abortion, attended with pains all over the system, and excessive debility of the joints, which remained for several months in a greater or less degree. It is an aphrodisiac, and will excite the venereal appetite when taken internally; but its aphrodisiac effects are said to be more marked when a solution of it is injected into the rectum, and retained there an hour or two. A solution of ten or fifteen grains to the fluidounce of water, injected, will, in two or three hours, produce a powerful venereal excitement. And if the strength of the solution be doubled, it will cause powerful erections, and several copious seminal emissions.

It is in extensive use as an external application in aphthous and inflammatory affections of the mouth and throat, and in scaly cutaneous diseases. A solution of one drachm in five fluidounces of water, with a little sugar or honey, forms one of the best applications for use as a gargle in the early stage of mercurial salivation, and also in all varieties of aphthous ulceration of the mouth and throat. One drachm of borax dissolved in two fluidounces of distilled vinegar, is said to be an excellent lotion for ringworm of the scalp. In liver spots, (*pityriasis versicolor*), it has also been found beneficial, and in pruritus vulva, combined with morphia. Combined with sugar it forms an excellent collyrium, and enters into several cooling or refrigerant lotions. The dose of borax is from ten to thirty grains, dissolved in water, or in infusion of elm or flaxseed.

Off. Prep.—Lotio Boracis; Lotio Boracis cum Morphiæ.

SODÆ CARBONAS.

Carbonate of Soda.

History.—Carbonate of Soda exists in a native state in various parts of the world in mineral waters, lakes, and springs, or in the surface of the soil, which frequently exhibits a saline efflorescence. It sometimes occurs as a mineral in the form of sesquicarbonate, and is found abundantly in the ashes of marine and salt-marsh plants. Thus, it is found in France in the waters of Vichy and of Vals, in Hungary in the waters of Bilin, and in Iceland in the Geyser springs; as a mineral, it is found

in Hungary, Egypt, South America, and in Northern Africa. The principal part of the commercial salt is, however, prepared artificially, being much purer than that otherwise obtained.

The ashes of marine plants furnish an impure soda, which is called *Barilla*, or *Kelp*. *Barilla* is obtained from a variety of plants, chiefly of the genera *Salicornia*, *Salsola*, and *Chenopodium*. When ripe, these vegetables are cut down, dried, and burnt. The ashes contain from twenty-five to forty per cent. of carbonate of soda, and when of good quality, are in hard, dry, porous, sonorous, grayish-blue masses, which upon exposure to the air become covered with a saline efflorescence. *Barilla* is prepared chiefly in Spain and Sicily. *Kelp* is procured from various seaweeds, principally the *Algæ* and *Fuci*. The plants are allowed to ferment in heaps, then dried, and burnt. A large solid mass is formed, which is broken into small fragments. As found in commerce, kelp is in hard, vesicular, dark-gray, bluish, or greenish masses, having a sulphurous odor, and a caustic acrid taste. It contains from five to eight per cent. only of carbonate of soda, and was formerly abundantly manufactured in Great Britain, and especially in the Orkney and Hebrides islands.

The artificial salt is prepared by decomposing the sulphate of soda; which salt is more commonly made by converting common salt (chloride of sodium) into the sulphate, by means of sulphuric acid. The sulphate being thoroughly dried is intimately mixed with its weight of limestone-powder, or chalk, and half its weight of powdered pit-coal; the whole mixture is then subjected to a strong heat in a reverberatory furnace, and frequently turned over, till flames cease to be emitted, and a pasty, black mass is obtained called *Black Ash*, *Black Soda-ash*, *Black Balls*, or *British Barilla*. When properly prepared this contains soda chiefly in the caustic state, and equivalent to about 55 per cent. of the dry carbonate. When this is lixiviated and evaporated to perfect dryness, the soda becomes partly carbonated, and a white or gray compact substance is produced, which is called *Soda-ash* or *White Soda-ash*. The carbonate of soda is obtained by calcining this soda-ash in a reverberatory furnace, with its weight of sawdust or coal-dust, the temperature being maintained between 650° and 700°, till blue flames cease to issue; the sulphur is thus burnt all away, and all the soda becomes carbonated. The resulting mass is then lixiviated, concentrated till a pellicle forms on its surface, and then poured into tanks to crystallize. This mode of manufacturing carbonate of soda, is pursued on an immense scale in Great Britain, especially at Liverpool and Glasgow.

Carbonate of soda crystallizes in rhombic octahedres, or in large oblique rhombic prisms, or forms derived from the latter. These are colorless, transparent, alkaline, and disagreeable to the taste, speedily efflorescent in the air, soluble in twice their weight of cold water, insoluble in alcohol, and having an alkaline reaction. At a moderate heat

they lose their water of crystallization; if it be increased, they become converted into a white, opake, anhydrous carbonate. The anhydrous salt is fused at a full red-heat. Carbonate of soda may be known from the carbonate of potassa by its crystalline appearance and disposition to effloresce—from bicarbonate of potassa by its efflorescence—from bicarbonate of soda, by that being never distinctly crystalline. In solution, it may be discriminated from carbonate of potassa, by chloride of platinum, an excess of tartaric acid, or perchloric acid, occasioning no precipitate—and from bicarbonate of soda by giving a white precipitate with sulphate of magnesia, and a reddish-brown one with corrosive sublimate. It is *incompatible* with acids, acidulous salts, lime-water, muriate of ammonia, and earthy and metallic salts. It consists of one equivalent of soda 31.3, one of carbonic acid 22.12, and ten of water $90 = 143.42$. ($\text{Na O} + \text{CO}_2 + 10 \text{ Aq.}$) The quantity of water may, however, vary in its proportion, owing to the degree of efflorescence of the salt.

Sulphate of soda and chloride of sodium are the most common impurities met with; these may be detected by converting the carbonate into a nitrate, and then testing with chloride of barium, and nitrate of silver. When improperly prepared the salt is apt to contain some sulphureted of sodium, which may be known by the odor of sulphureted hydrogen which is emitted on dissolving it in water. Good carbonate of soda should be free from these impurities, though common salt is frequently present.

Properties and Uses.—In large doses carbonate of soda is corrosive and irritant; in medicinal ones, it is antacid, antilithic, and resolvent. When an overdose is taken, the best antidotes are fixed oils, acetic acid, lemon-juice, or cream of tartar. It has been used in diseases attended with acidity of stomach, especially gout, uric acid, gravel, dyspepsia, sick-headache, etc. It is more easily taken, and is less acrid and disagreeable than the carbonate of potassa. As with all the alkaline carbonates, if too long employed, it may bring on phosphatic gravel through the alkalinity of the urine; on this account, the bicarbonates dissolved in carbonic acid-water and taken, are preferable, as the excess of carbonic acid tends to keep the phosphates in solution. It has been recommended in pertussis, scrofula, and bronchocele, and as an internal and external agent in scaly and papular cutaneous diseases. In these latter affections, a lotion may be made by dissolving two or three drachms of the carbonate in a pint of water; or a bath may be employed, holding from eight to sixteen ounces in solution in the necessary quantity of water; or an ointment may be used, composed of from eight to sixty grains to the ounce of lard. The dose of carbonate of soda is from ten to thirty grains in solution.

Off. Prep.—Ferri Carbonas Saccharatum; Ferri Subcarbonas; Liquor Sodæ Chlorinatæ; Magnesiae Carbonas; Pilulæ Ferri Carbonatis; Sodæ Acetas; Sodæ Bicarbonas; Sodæ Carbonas Exsiccatus; Sodæ et Potassæ Tartras; Sodæ Phosphas; Zinci Carbonas Præcipitatus.

SODÆ SULPHAS.

Sulphate of Soda.

History.—Sulphate of Soda, also known as *Glauber's Salt*, from its discoverer in 1658, and *Vitriolated Soda*, exists more or less abundantly in various mineral springs, in sea-water, and in the form of mineral combined with sulphate of lime. It is found in the mineral springs of Carlsbad, Cheltenham, Sulphur springs of Virginia, Saratoga Pavilion spring, Geyser springs, and Paipa among the Andes, in the latter of which, it is so abundant, that it forms crystals upon the soil over which the water is thrown. It is likewise prepared artificially in great quantity in the processes for procuring muriatic acid and chlorine, and in obtaining muriate of ammonia from common salt and sulphate of ammonia. In some of the New England States, it is procured in the winter season from sea-water.

The Edinburgh Pharmacopœia gives the following formula for preparing it: Dissolve two pounds of the salt which remains after the distillation of pure muriatic acid (which is a supersulphate of soda), in three pints, Imperial measure, of boiling water; then add white marble in powder so long as effervescence takes place, or to saturate the excess of acid, boil the liquid, and when neutral, filter it; wash the insoluble matter (sulphate of lime) with boiling water, and add the washings to the original liquid; concentrate till a pellicle begins to form, and then set it aside to crystallize. Thomas, Dellisse, and Boucard have proposed a cheap process and which avoids the productions of muriatic acid vapors; it is by double decomposition between sulphate of iron, and chloride of sodium.

Sulphate of soda crystallizes in large oblique rhombic prisms, often truncated on their acute edges so as to form six-sided prisms, and terminated by two, four, or six converging planes; when hastily crystallized, the crystals are small and acicular. Its crystalline form and general appearance resemble those of the sulphates of magnesia and zinc. It is colorless and transparent, possessing a cooling, bitter, saline, nauseous taste, and effloresces in the air, its surface becoming covered with an opaque white powder. It is soluble in three times its weight of cold, and in its own weight of boiling water, and is insoluble in alcohol. Exposed to heat it fuses in its water of crystallization, which is expelled by an elevated heat, with the exception of one equivalent of water; this is removed, however, by a low red-heat, and at a full red-heat, the salt fuses again, losing $55\frac{1}{2}$ per cent. of its weight. It is not subject to adulteration, though it occasionally contains an excess of alkali or acid, which may be ascertained by turmeric or litmus paper. Salt may be detected by sulphate of silver; iron by tincture of galls, or ferrocyanuret of potassium. Sulphate of soda is *incompatible* with the salts of lime, baryta, and lead, carbonate of potassa, and nitrate of silver. It is

composed of one equivalent of soda 31.3, one of sulphuric acid 40, and ten of water $90=161.3$ ($\text{Na O} + \text{SO}_3 + 10 \text{HO}$).

Properties and Uses.—Sulphate of soda is cathartic, aperient, and diuretic, but on account of its disagreeable taste, it has gradually been displaced by the sulphate of magnesia. As a cathartic the dose is from four drachms to an ounce, dissolved in eight or ten ounces of water; as an aperient and diuretic the doses must be smaller, and largely diluted with water. As the salt by efflorescence loses about half its weight of water, when the effloresced article is used, the dose will be only one half of the above quantities. A few drops of sulphuric acid, or a little lemon-juice, or cream of tartar, added to the solution, will lessen its nauseous and bitter taste.

SODII CHLORIDUM.

Chloride of Sodium.

History.—Chloride of Sodium (*Sodæ Murias*, *Muriate of Soda*, *Common salt*), exists abundantly in nature either in solution, or in the solid state. In the state of solution it is found in many springs, lakes, and in sea-water, which contains about 2.7 per cent. of it, and from which it is obtained either by spontaneous evaporation in warm countries, constituting the *bay-salt* of commerce, which is in large grains approaching the cuboidal form, or, by concentrating the sea-water with the aid of heat, constituting the *sea-salt* of commerce, which is in small, white, irregular grains, tending to the cubic form. In the evaporation of sea water, sulphate of lime is deposited in the early part of the process, and after the crystallization of the chloride of sodium, a large proportion of magnesian salts remain in the mother-water. All salt waters have the salt obtained by evaporation in large iron boilers, or by spontaneous evaporation, depending on the amount of salt contained in the water, and the temperature of the climate. In the solid state, salt is found in various parts of the world, forming extensive beds, and even entire mountains, from which it is removed in blocks or large masses by mining operations; in this state it is called *Rock Salt*, *Fossil Salt*, *Gem Salt*, etc. It is either transparent or translucent, exhibiting various colors, as red, yellow, blue, brown, etc., owing probably to the presence of manganese and iron, and from which it may be purified by solution, and crystallization. In the United States a great amount of salt is made at Salina, Montezuma, Galena, on the Kanawha, etc., from saline springs which either flow naturally, or are produced artificially by sinking shafts to various depths in places where salt is known to exist. Although there are several varieties of salt recognized in commerce, the essential difference between them is in the size and density of the grains, rather than in a difference of composition.

Chloride of sodium by slow evaporation crystallizes in transparent, colorless, and regular cubes, but by hasty evaporation it forms hollow

quadrangular pyramids. It is permanent in the air, but becomes moist on the surface in a damp atmosphere, or when chloride of magnesium is present. It is sparingly soluble in alcohol, and dissolves in two and two-third parts of cold water; boiling increases its solubility but very slightly. Heat causes it to decrepitate from the presence of water inclosed in the crystals; a red heat fuses, and a white heat volatilizes it in white fumes without decomposition. It communicates a bright yellow hue to the flame of spirit. Nitrate of silver added to its solution occasions a curdy white precipitate of muriate of silver, soluble in ammonia. It does not yield a yellow precipitate with chloride of platinum, or a crystalline deposit with tartaric acid, as is the case with chloride of potassa. It is very apt to contain sulphates of lime and magnesia, and chlorides of magnesium and calcium. Pure chloride of sodium is not precipitated by ferrocyanuret of potassium, carbonate of soda, or chloride of barium. It is *incompatible* with nitric, sulphuric, and several other acids, carbonate of potassa, nitrate of silver, and protoxide of mercury. It is composed of one equivalent of chlorine 35.42, and one of sodium 23.3=58.72, $\text{Na}+\text{Cl}$.

Properties and Uses.—Chloride of sodium in large doses is emetic and cathartic; in small ones, tonic, alterative, and anthelmintic. It is useful in all chronic diseases characterized by a pale color of the tongue with a white coat or fur. In teaspoonful doses, taken dry, it often checks hemoptysis, and used moderately it promotes digestion, removes strumous diseases, cures some forms of dyspepsia, and gives tone to the digestive organs of children, and corrects the disposition to generate worms. It proves a salutary stimulus even in health when taken in very small quantity, but an undue amount of it used daily, does, undoubtedly, in many persons dispose to plethora and corpulency. In spasms of an epileptic or apoplectic character, the effects of intemperance, salt and mustard, a teaspoonful or two of each, given in warm water, every ten or fifteen minutes, until free emesis is produced, will be found the most efficient emetic. In these cases, counter-irritation may be produced by bastinadoing the feet, and after the vomiting, the patient may drink freely of good fresh milk. During the cholera of 1849–50–51, in Cincinnati, much benefit was derived from the following mixture: Black Pepper, in powder, fine Table Salt, of each, one teaspoonful; Vinegar, five teaspoonfuls; Hot Water, half a tumblerful. Dose, a tablespoonful every five, ten, or fifteen minutes, as circumstances required. It speedily checked vomiting, abated the watery discharges, and removed the cramps. It succeeded in many cases, where every other means had failed. Externally, applied in solution, salt is useful as a fomentation in bruises or sprains, as a tonic and excitant application in depraved conditions of the system, as a collyrium in some ophthalmic diseases, and is frequently used as an ingredient in stimulating enemata. A pound of salt to four gallons of water forms a suitable salt-water bath, acting as a

tonic and excitant in debilitated and strumous habits. The dose of salt as a tonic and alterative, is from ten to sixty grains. It has recently been recommended as a remedy in phthisis and intermittent fever. The entire absence of salt in the food, gives rise to a cachectic condition, and other morbid states, with the formation of an abundance of intestinal worms.

Off. Prep.—Acidum Muriaticum Purum ; Liquor Sodæ Chlorinatæ ; Sodæ Murias Purum.

SOLANUM DULCAMARA.

Bittersweet.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE ROOT AND TWIGS.

Description. — Bittersweet or *Woody Nightshade*, is a woody vine, having a woody *root*, with a shrubby, flexuous, thornless and branching *stem*, several feet in length, and having a grayish-green *bark* on the stem and large branches. The *leaves* are alternate, acute, mostly smooth, though sometimes pubescent, veined, of a dull-green color, and petiolate ; the lower ones are ovate or cordate ; the upper, halbert-shaped, or with two ear-like lobes at the base, sometimes only one side ; most of them are entire. The *flowers* are purple, and are disposed in branched cymose racemes, opposite the leaves or terminal, drooping, divaricate, and on alternately subdivided peduncles. *Bracts* minute. The *calyx* is very small, acute, purplish, and divided into five persistent segments. The *corolla* is rotate, and consists of five purple reflexed segments, which are acute, ovate, with two roundish, shining greenish spots at the base of each. The *filaments* are very short ; the *anthers* erect, yellow, somewhat connected into a conical tube. *Ovary* roundish, bearing a filiform style, longer than the anthers, with a simple, obtuse *stigma*. The *fruit* is a scarlet, oval, juicy berry, containing several whitish, plano-convex seeds.

History.—Bittersweet, also known by the names of *Violet-bloom*, and *Scarlet-berry*, is common to both Europe and this country, growing in shady, fertile situations, especially where there is some moisture, and flowering from June to August. Its berries are ripened in autumn, and remain on the vine during most of the winter. There are several varieties of it, founded on the form of the leaves, and their smoothness or pubescence. The officinal portion are the small stems or twigs, though the whole plant is medicinal. The berries, when eaten, have certainly produced serious consequences, though considered by many to be innocuous. The best time for gathering the twigs is in autumn, after the leaves have fallen ; those plants growing in high and dry situations are said to be the best.

When dried, the twigs are of various lengths, light, hollow, cylindrical, about as thick as a goosequill, wrinkled and of a grayish-ash color externally, and consisting of a thin bark, an interior woody portion, and a central pith. When fresh, they emit on being bruised, a peculiar, nauseous odor, and have a taste at first bitter, followed by some sweetness, and which has given origin to the name of the plant; when dried they are inodorous, but of the same taste with the fresh twigs. They impart their virtues to boiling water, and diluted alcohol; but long boiling destroys their activity. They are found to contain a sweetish, bitter extract, named Dulcamarin or Picroglycion; a narcotic alkaloid, named Solania; beside gum, gluten, and other unimportant ingredients. Its active principle is, probably, the solania.

Several other species of *Solanum* have been employed medicinally. The *Solanum Tuberosum* or *Common Potato* is said to possess narcotic properties. An extract prepared from the leaves has been given in doses of from half a grain to two grains in cough and spasmodic affections with advantage; the stem and unripe berries have also been employed. The extract has also been of service in chronic rheumatism and painful affections of the stomach and bowels. The potato itself, has been eaten in a raw state, either with or without vinegar, in cases of scurvy, and with good effect; occasionally it produced narcotic symptoms, with a slight action on the bowels. Some practitioners have, however, employed it in the above-named forms, without producing any sensible effect. Probably, cultivation, soil, climate, season, etc., exert some influence upon the properties of the plant. Dr. J. Otto found Solania in the germs of the potato. The stalks of potato furnish a large quantity of potassa. If the stalks are cut while the plant is in flower, and the juice obtained by bruising and pressing, a bright yellow dye will be obtained.

SOLANUM LYCOPERSICON, (*Lycopersicon Esculentum*,) or Tomato, is a native of South America. The fruit contains a peculiar acid, and a brown, tarry, odorous, resinous matter, with some indications of the presence of an alkaloid. It forms a very healthy article of food, and exerts a marked influence on the biliary functions. The leaves have a nauseous, narcotic odor, and contain an alkaloid very analogous to Solania, a peculiar oil, and animal-extractive. Nearly all of the *Solanums* are possessed of nutritive or medicinal properties.

Solania may be best obtained from the potato. In the beginning of June, collect the sprouts, and press them down in a suitable vessel, by means of pebbles. Then cover them with water acidulated with sulphuric acid, so as to have a strongly acid reaction during the maceration, and allow them to macerate for twelve or eighteen hours. Then express by hand, and the liquor, with the addition of fresh portions of sulphuric acid, is to be added twice successively, as at first, to fresh portions of sprouts, and in like manner separated by expression. After standing for

some days, it must be filtered, and treated with powdered hydrate of lime in slight excess. The precipitate which forms, is to be separated by straining, dried in a warm air, and boiled several times in alcohol. The alcoholic solution, being filtered while hot, will upon cooling deposit the solania in flocculent crystals. An additional quantity of the alkalioid may be obtained by evaporating the mother liquor to one-fourth its volume, and then allowing it to cool. The whole residuary liquor will assume a gelatinous consistence, and, upon being dried, will leave the solania in the form of a translucent, horny, amorphous mass. Solania may be obtained impure from *S. Dulcamara* or *S. Nigrum*, by precipitating the expressed juice of the plant with ammonia, and then purifying by repeated solution in alcohol, and decolorizing with animal charcoal. When pure, solania is in the form of a white, opaque powder, or of delicate acicular crystals, permanent in the air, inodorous, of a bitter taste, fusible at a little above 212° F., scarcely soluble in water, soluble in alcohol or ether, and neutralizing acids without forming crystallizable salts. Its solution becomes deep-brown or brownish-yellow on the addition of iodine; and sulphuric acid causes it to become at first reddish-yellow, then purplish-violet, then brown, and finally colorless, with a brown pulverulent precipitate. Solania has not been used in medicine; two grains administered to a rabbit, produced symptoms of coma and paralysis, followed by death; somewhat larger doses caused vomiting in dogs and cats, succeeded by drowsiness.

Picroglycion may be obtained by treating the watery extract of *S. Dulcamara* with alcohol, evaporating the tincture, dissolving the residue in water, precipitating the solution with subacetate of lead, decomposing the excess of this salt by sulphureted hydrogen, then evaporating the liquor to dryness, and treating the residue with acetic ether. Upon spontaneous evaporation the principle is obtained in the form of small isolated crystals.

Properties and Uses.—*Solanum Dulcamara* is feebly narcotic, diuretic, alterative, diaphoretic, and discutient. It has been chiefly used in syrup or decoction in cutaneous diseases, syphilitic diseases, rheumatic and cachectic affections, ill-conditioned ulcers, scrofula, indurations from milk, leucorrhœa, jaundice, and obstructed menstruation. It is of more benefit in scaly cutaneous diseases, than others, as in lepra, psoriasis, and pityriasis, and especially when combined with guaiacum, and yellow dock root. When taken in large doses it produces nausea, vomiting, faintness, vertigo, and spasmodic action of the muscles. With many persons, the face and hands become purplish, and the circulation depressed while under its influence. It is said to be antaphrodisiac, and has proved useful in mania in which the venereal functions were strongly excited. Equal parts of the twigs, yellow dock root, and stillingia, made into a syrup, form a valuable preparation for scrofulous affections,

as well as syphilitic. Externally, in the form of ointment, it is employed as a discutient to painful tumors, also as an application to some forms of cutaneous disease, ulcers, and erysipelatous affections. Dose of the decoction or syrup, one or two fluidounces; of the extract, from two to five grains; of the powdered leaves, from ten to thirty grains.

Off. Prep.—Decoctum Solani.

SOLANUM NIGRUM.

Garden Nightshade.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES.

Description.—*Solanum Nigrum* is a fetid narcotic, bushy herb, with a fibrous root, and an erect, branching, angular, herbaceous, thornless stem, one or two feet in height. The leaves are undivided, ovate, toothed and waved, smooth, lengthened out at the base, and almost always with the lamina perforated and the margin erose as if gnawed by insects. Umbels from the intermediate spaces between the leaves, solitary, peduncled, simple, downy, and nodding. Flowers white or pale-violet, with a musky scent; anthers yellow. Berries globose, black, about the size of peas.

History.—The Garden or Deadly Nightshade, is found growing along old walls, fences, and in gardens, in various parts of the United States, flowering in July and August. There are several varieties of this species, of which the *Solanum Virginianum* is the most abundant in this country. It has an erect, prickly stem; pinnatifid leaves, prickly on both sides; divisions sinuate, obtuse; margin ciliate; calyx prickly, and flowers blue, or whitish. The leaves are the parts employed, and yield their properties to water, alcohol, or fixed oils.

Properties and Uses.—*Solanum Nigrum* is a narcotic and sedative, producing, when given in large doses, nausea, and giddiness. One to three grains of the leaves infused in water, will, it is said, produce a copious perspiration, and often purge on the next day. They have been used in cancerous, scrofulous and scorbutic diseases, being given internally, and at the same time, applied to the affected parts in the form of poultice or ointment. Solania exists in it more abundantly than in the *S. Dulcamara*, to which it is somewhat analogous in medicinal properties, with more active and energetic narcotic virtues. The berries are poisonous, causing torpor, burning in the stomach, fever, nausea, stupor, and insensibility; though this is denied by M. Dunal of Montpellier. The plant is used by Eclectics in the form of ointment only, as a discutient.

Off. Prep.—Unguentum Stramonii Compositum.

SOLIDAGO ODORA.

Sweet-scented Goldenrod.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE LEAVES.

Description.—This plant is also known as *Fragrant-leaved Goldenrod*, and *Sweet Goldenrod*; it has a perennial, woody, much branched and creeping root, and a slender, round, yellowish-green stem, smooth or slightly pubescent below, pubescent at top, often reclined, and two or three feet in height. The leaves are closely sessile, linear-lanceolate, broad at base, entire, acute, rough at the margin but otherwise smooth, with a prominent midrib, and covered with small pellucid dots. The flowers are of a deep golden-yellow color, and are arranged in a terminal, compound, and usually secund-paniculate raceme, the branches of which are very slender, rigid, and spread almost horizontally, are each accompanied by a small leaf, and support the flowers on downy pedicels, which put forth from the upper side of the peduncle, and have small, linear, subulate bracts at their base. Scales of the involucre oblong, acute, smooth, or slightly pubescent, the lower ones shorter, and closely imbricating the rest. Florets of the ray few, with oblong, obtuse, yellow ligules; those of the disk funnel-shaped, with acute segments. Pappus shorter than the florets of the disk. (The leaves of this plant are from an inch and a half to three inches long by from three to five lines broad, with a strong, yellowish midvein, but no veinlets.)

History.—This is one of an extensive genus of herbaceous perennials, most of the species of which are natives of North America; their general character is that of mild astringency, combined in a few species with some aromatic stimulating qualities. The *S. Odora* is a native of most parts of the United States, growing in dry or sandy soil, and flowering from July to October. The leaves are the officinal portion, they have a fragrant odor, partaking of anise and sassafras, more perceptible on bruising them, and a warm, aromatic, agreeable taste, which properties depend on a pale-greenish-yellow volatile oil, lighter than water, and which may be obtained by distillation with water. When properly dried the leaves form an excellent substitute for tea. They impart their virtues to alcohol, or boiling water in infusion; but boiling injures them.

Properties and Uses.—Sweet scented Goldenrod is moderately stimulant, aromatic, and carminative; and in warm infusion, diaphoretic. It may be given to allay flatulence, nausea, and to cover the taste, or correct the operation of unpleasant or irritating medicines. The oil is carminative and diuretic: and its tincture, or essence, has been used as a diuretic in suppression of urine among infants, and as an external application in headache. Its essence is useful in flatulency, to arrest vomiting and spasmodic pains in the stomach, and to disguise the taste of

nauseous medicines. The flowers are said to be aperient, tonic, astringent, and diuretic, and have been found beneficial in gravel, urinary obstructions, ulceration of the bladder, and in the early stage of dropsy; taken in infusion.

SOLIDAGO RIGIDA.

Hardleaf Goldenrod.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE LEAVES AND BLOSSOMS.

Description.—This plant is also termed *Rigid Goldenrod*; it has a simple stem, corymbose above, terete, round, striate, rough, minutely hairy, very leafy, and from three to five feet in height. The leaves are from one to four inches long, ovate-oblong, rough, with minute, rigid hairs; the upper ones being entire, veiny, thick and rigid; the lower closely sessile, by a broad base, slightly serrate; the radical ones lanceolate, acuminate, nerved, petiolate, sometimes near a foot long, and about two or two and a half inches broad. The flowers are all yellow, and arranged in a terminal, compound, close, compact, paniculate-raceme. Heads very large, about thirty-four flowered; rays twice the length of the obtuse involucre, deep-yellow, from seven to ten, and about three lines by one. Scales of the involucre round-obtuse, nerved, membranaceous at the edges.

History.—This is a tall species growing in dry fields and rocky woods throughout the United States, and is abundant in the Western prairies, flowering in August and September. It is the styptic plant of old Dr. Bone, of New Jersey, who is said to have suppressed hemorrhages from large blood-vessels, by applying it locally, in the powdered state; a property likewise attributed to the *Solidago Virgaurea* or *European Goldenrod*, found in this country and Europe. The leaves and blossoms of *S. Rigida* are the parts employed; they have an astringent taste, and yield their virtues to water or alcohol.

Properties and Uses.—Hardleaf Goldenrod is tonic, astringent, and styptic. In powder or infusion, it is beneficial in all external hemorrhages, epistaxis, hemotypsis, hematemesiis, and hemorrhage from the bowels. Applied with excellent effect in form of poultice, to old ulcers. The oil is diuretic. The plant deserves further investigation.

SPIGELIA MARILANDICA.

Pinkroot.

Nat. Ord.—Rubiaceæ; *Suborder*, Spigeliæ. *Sex. Syst.*—Pentandria Monogynia.

THE ROOT.

Description.—Botanists vary in their arrangement of this plant; beside the above given order and suborder, we find it classed in the natural

order *Gentianaceæ*, also *Spigeliaceæ*, and again *Loganiaceæ*. It is usually known as the *Carolina Pink*, or *Worm-grass*. It is a herbaceous, indigenous plant, with a perennial, very fibrous, yellow root, which sends up several erect, simple, nearly smooth, four-angled stems, of a purplish color, and from six to twenty inches high. The leaves are opposite, sessile, ovate-lanceolate, acute or acuminate, entire, and smooth, with the margin and veins roughish-hairy; they are three or four inches long by an inch and a half, or two inches and a half broad, and the stipules are scarcely perceptible. The flowers are few in number, are arranged in a terminal, secund spike, and supported on short pedicels; they are somewhat club-shaped, scarlet externally, yellow internally, and from an inch and a half to two inches in length. The calyx is persistent, with five long, linear, subulate, finely serrulate divisions, which are reflexed in the ripe fruit. The corolla is funnel-shaped, four times as long as the calyx, the tube inflated in the middle and angular at top, and divided into five acute, spreading segments, the edges of which are slightly tinged with green. The stamens are short, inserted into the mouth of the corolla between the segments; anthers oblong, heart-shaped, exserted. Ovary small, superior, ovate; style about the length of the corolla, jointed near its base, and terminating in a linear, fusiform, fringed stigma, projecting considerably beyond the corolla. The capsule is double, consisting of two cohering, one-celled, globular carpels attached to a common receptacle, and containing numerous, small, angular seeds.

History.—This plant is a native of the United States, growing in dry rich soils, and on the borders of woods, seldom found north of the Potomac, and flowering from May to July. There are several varieties, both as regards the form of the leaves and the color of the flowers. It was known to the natives as a vermifuge, and was in use among the early colonists in the Southern States a long time before it became known to the profession, to whom it was introduced by Drs. Garden, Lining, and Chalmers, of South Carolina. As received at present, spigelia is in bales or casks, consisting almost exclusively of the root, without the stem or leaves; that contained in casks is less liable to become damp and moldy, and is consequently preferred to that in bales. The officinal part is the root; this consists of numerous, slender, branching, crooked, wrinkled fibers, from three to six inches long, forming a dense bunch, and arising from a short rhizome, which exhibits traces of the stems of former years. Externally it is brown or yellowish-brown, of a feeble, peculiar odor, and a sweetish, slightly bitter, not very unpleasant taste. Boiling water extracts its medicinal qualities. Analysis has detected in it fixed and volatile oil, a small quantity of resin, a brown-colored extractive of a bitter and nauseous taste, on which the vermifuge power probably depends, a mucilaginous saccharine matter, albumen, gallic acid, some salts, etc. A long, slender, crooked, yellowish root, thickly set

with short capillary fibers, and much smaller and lighter colored than the pinkroot, will sometimes be found mixed with it; these are the roots, chiefly, of a small vine which attaches itself to the stem of the spigelia, and should be separated before using the medicine. Age impairs the activity of pinkroot. The leaves and stalks of spigelia should always be rejected.

Properties and Uses.—Pinkroot is an active and certain anthelmintic, especially for children. In large doses, it is apt to purge, and likewise produce symptoms of narcotism, exciting the circulation, determining the blood to the brain, giving rise to vertigo, dimness of vision, dilated pupils, spasms of the facial muscles, and sometimes even causing convulsions. Spasmodic movements of the eyelids are among its most common attendants. These narcotic effects are less liable to occur when the medicine purges, and are entirely obviated by combining it with cathartics. Dose, of the powder, for a child three years old, from ten to twenty grains, or a fluidounce or two of a strong infusion, to be given at bed-time, followed in the morning by a cathartic. It is also useful in those conditions of the system, caused by worms, which resemble infantile remittent and other febrile diseases, and hydrocephalus. A well known worm tea is composed of pinkroot half an ounce; senna two drachms; savin half a drachm; manna two drachms. Mix, and infuse in a pint of water; dose one or two fluidounces. Dose of powdered pinkroot for an adult, one or two drachms twice a day for several successive days, and then followed by a cathartic.

Off. Prep.—Extractum Spigeliæ et Sennæ Fluidum; Infusum Spigeliæ.

SPIRÆA TOMENTOSA.

Hardhack.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Pentagynia.

THE WHOLE PLANT.

Description.—This plant, known also by the names of *Meadow-sweet*, *White-leaf*, and *Steeple-bush*, is a small shrub, from two to four feet in height, with many, simple, erect, round, downy, hard, brittle and purplish stems, furnished with alternate leaves, crowded on very short petioles. The leaves are from an inch and a half to two inches long, and about half as wide, ovate-lanceolate, or oblong, unequally serrate, somewhat acute at both ends, smoothish and dark-green, or brownish above, and covered with a rusty white, dense tomentum beneath. The flowers are small, very numerous, subsessile, beautifully red or purple, and are disposed in very short, dense, slender, compound, terminal spikes or racemes. The calyx is campanulate, with five acute segments. The petals are five, round. The stamens are numerous, exserted and con-

spicuous. *Styles* five; *carpels* five, tomentose and spreading; *seeds* subulate at each end.

History.—This is a beautiful shrub, common in low grounds and meadows, in most parts of the United States, and flowering in July and August. The whole plant is officinal. As found in the shops, it is in packages of various sizes, containing a mixture of leaves and flowers, and frequently the bark. Its odor is somewhat similar to that of black tea, and its taste bitter and exceedingly astringent. Water extracts its medicinal virtues. It has not been analyzed thoroughly, but is known to contain bitter extractive, tannic and gallic acids. The fruit is persistent, remaining through the winter, and furnishing food for the snow-bird.

Properties and Uses.—Hardhack is tonic and astringent; useful in diarrhea, cholera infantum, and other complaints in which astringents are indicated, and is less apt to disagree with the stomach than most other astringents. As a tonic, it may be used in cases of debility, with want of appetite. The best form of administration is an extract, made by displacement, and evaporation in a water-bath, which affords a beautiful article, of an agreeable odor, and astringent, bitter taste, that is fully equal to catechu, and might replace it in all cases where that medicine is required; the dose is from two to ten grains. Dose of the decoction, one or two fluidounces.

SPIRIT VAPOR-BATH.

History and Uses.—A spirit vapor-bath exerts a most powerful, yet beneficial influence upon the whole system, aiding very materially our endeavors to remove disease. This highly valuable mode of producing activity of the cutaneous vessels has long been practiced in many sections of the country as a domestic remedial agent, and was first introduced to the notice of the medical profession by myself, about eighteen years ago, since which it is in much use among physicians. The advantages to be derived from this method of producing perspiration are very great, and it is not followed with any of those injurious consequences which often attend the internal administration of a sudorific.

It is to be given as follows: The patient is undressed, ready for getting into bed, having removed the shirt and underclothing worn through the day, and put on a night shirt or other clothing to be worn only while sweating, and during the night, if the bath is taken at bedtime. He is then seated on a high windsor, or wooden bottomed chair, or instead thereof, a bench or board may be placed on a common open bottomed chair, care being taken that the bottom is so covered that the flame will not burn him. After seating himself, a large blanket or coverlid is thrown around him from behind, covering the back part of his head and body, as well as the chair, and another must be passed

around him in front, which last is to be pinned at the neck, loosely, so that he can raise it and cover his face, or remove it down from his face, from time to time, as occasion requires, during the operation of the bath. The blankets must reach down to the floor, and cover each other at the sides, so as to retain the vapor, and prevent it from passing off.

- This having been done, a saucer or tin vessel, into which is put one or two tablespoonfuls of whisky, brandy, spirits, alcohol, or any liquor that will burn, is then placed upon the floor, directly under the center of the bottom of the chair, raising a part of the blanket from behind to place it there; then light a piece of paper, apply the flame to the liquor, and as soon as it kindles, let down the part of the blanket which has been raised, and allow the liquor to burn till it is consumed, watching it from time to time to see that the blankets are not burned. As soon as consumed, put more liquor into the saucer, about as much as before, and again set it on fire; being very careful to pour no liquor into the saucer while the flame exists, as there would be danger of burning the patient, blankets, and perhaps the house. Continue this until the patient sweats or perspires freely, which in a majority of cases will be in five or ten minutes.

If, during the operation, the patient feels faint or thirsty, cold water must be sprinkled or dashed in his face, or he may drink one or two swallows of it; and in some cases, the head may be bathed with cold water.

As soon as free perspiration is produced, wrap the blankets around him, place him in bed, and cover him up warm, giving him about a pint of either good store tea, ginger, or some herb tea to drink, as warm as he can take it. After two or three hours, remove the covering, piece by piece, at intervals of twenty or twenty-five minutes between each, that he may gradually cease perspiring.

There is no danger of taking cold after this spirit vapor-bath, if the patient uses ordinary precaution; and if his disease will allow, he can attend to his business on the next day the same as usual. In fact, the whole is a very easy, safe, agreeable and beneficial operation; much more so than a mere reading of the above explanation would lead one to suppose.

Chairs are now manufactured expressly for this purpose.

This bath is a favorite with Eclectics, and is highly beneficial in colds, pleurisy, and all febrile and inflammatory attacks, diarrhea, dysentery, sluggishness of cutaneous vessels, and in all chronic disease where there is an abnormal condition of the skin. In acute diseases, it may be repeated once a day, if required; in chronic diseases, once or twice a week, or once in a fortnight, according to indications.

Where it can be done, it is always preferable to bathe the patient with an alkaline wash, both before and after this vapor-bath.

SPIRITUS PYROXILICUS.

Pyroxylic Spirit.

History.—This substance was discovered in 1812 by P. Taylor, since which it has been examined by various chemists; it has been called, *Pyroligneous Ether*, *Wood-Naphtha*, *Wood Spirit*, *Wood Alcohol*, *Pyroxylic Alcohol*, *Methylic Alcohol*, *Hydrated Oxide of Methylene*, etc.

When wood is subjected to destructive distillation, there is formed, beside acetic acid, tar, and other products, about one per cent. of an inflammable, volatile liquid, which when separated and purified, constitutes pyroxylic acid. Pure anhydrous pyroxylic spirit is a mobile, colorless liquid, having a hot and pungent taste, and an aromatic odor, similar to that of acetic ether; it readily combines with water, alcohol, or ether, without disturbing its transparency. It burns like alcohol, the flame, however, being less luminous, and resembles it as a solvent, as all bodies that are soluble in alcohol are likewise soluble in pyroxylic spirit. Its specific gravity as a liquid is 0.798; as a vapor 1.042. At 140° it boils, and its vapor causes concussions which render its distillation difficult, but which may be prevented by placing in the bottom of the vessel, a layer of mercury. It is sometimes confounded with pyroacetic spirit, which may be distinguished by adding a few drops of a saturated solution of chloride of calcium, which dissolves in the pyroxylic spirit, but has no action on the latter, separating from it after agitation. The liquid examined must be sufficiently pure not to separate into two layers, nor to become milky on the addition of water.

Properties and Uses.—Used to palliate consumptive cough, and lessen the febrile excitement attending phthisis. It appears to act as a narcotic, sedative, and anti-emetic. It arrests or greatly mitigates chronic vomiting, whether dependent on functional or organic diseases; and is reputed efficacious in diarrhea and dysentery. Recommended by Dr. John Hastings in consumption, but is inefficient as a curative agent. Dose, ten to forty drops, three times a day; sufficiently diluted with water. A crude pyroxilic spirit of sp. gr. 0.846 to 0.890, is used by chemists to burn in lamps as a substitute for alcohol; and by hatters and varnish makers for dissolving resinous substances.

SHELL-LAC SPLINTS.

Preparation.—Take of finely pulverized shell-lac *one pound*, alcohol, 90 per cent. *one quart*; mix, and expose it to a moderate heat in a loosely stopped bottle, for forty-eight hours, when the shell-lac will be dissolved. With this solution saturate woolen cloth, and allow it to dry. To apply and fit the cloth to any part, cut it into the proper shape, and then hold it near a fire or hot stove, or dip it into boiling water, when it will become soft and pliable. As soon as it has cooled so as

not to burn the patient, apply it to the part, and by holding it for a few minutes, or by the application of the bandage while it is yet pliable, it will assume any form desired, and on cooling, it becomes hard, and remains exactly as at first placed. If it is desirable to strengthen the splint, take two pieces of the saturated cloth, spread one side of each with a thick coat of the solution, by means of a common paint-brush, allow the alcohol to evaporate, and then, placing these two coated sides together, press them with a hot flat-iron, until they have become perfectly cemented. This operation may be repeated several times, if it is necessary to increase the strength of the cloth, or splint.

SPONGIA.

Sponge.

History.—Sponge is a flexible, fixed, torpid, polymorphous animal, composed either of reticulate fibers, or masses of small spires interwoven together, and clothed with a gelatinous flesh, full of small mouths on its surface, by which it absorbs and ejects water. They inhabit the bottom of the sea, where they are fixed to rocks, or other solid bodies, and are most abundant within the tropics. The coarser kind are imported from the Bahamas; but the finest and best sponges are brought from the Mediterranean.

Sponge, as in the shops, is in yellowish-brown masses, of various shape and size, light, porous, elastic, and composed of fine, flexible, tenacious fibers, interwoven in the form of cells or meshes. It usually contains numerous minute fragments of coral, stone, or small shells, from which it must be freed before it can be used for ordinary purposes. Sponge is prepared by macerating it for several days in cold water, beating it, in order to break up the concretions which it contains, and dissolving what cannot thus be separated of the calcareous matter by muriatic acid, diluted with thirty parts of water. By this process it is rendered perfectly soft and fit for surgical use; and when intended for surgical purposes, the softest, finest, and most elastic sponges should be selected. For forming *burnt sponge*, the coarser will answer equally well. Sponge contains gelatin, coagulated albumen, iodine, common salt, sulphur, phosphorus, carbonate of lime, magnesia, silica, iron, bromine, etc.

Properties and Uses.—In consequence of its softness, porosity, and property of imbibing liquids, sponge is very useful in surgical operations. It may likewise be advantageously applied over certain ulcers, the irritating sanies from which it removes by absorption. Compressed upon a bleeding vessel, it is useful for promoting the coagulation of blood in epistaxis and external hemorrhages. Dipped in wax, and flattened, and then cut into the size and form required, it forms the *sponge tent*, useful for dilating sinuses. It has likewise been used for producing premature delivery, by introducing a piece of sponge into the mouth of the

uterus, and allowing it to remain there for a time, and then changing it, until by its swelling, and the irritation it produces, uterine contractions are caused.

SPONGIA USTA.

Burnt Sponge.

Preparation.—Take of sponge a convenient quantity, cut it into pieces, and beat it, that any extraneous matters may be separated, then burn it in a close iron vessel until it becomes black and friable, lastly rub it into very fine powder.

History.—In 1000 parts of sponge, 343.848 were dissipated by calcination; the remainder consisted of 327.0 parts of carbon and insoluble matters, 112.08 of chloride of sodium, 16.43 of sulphate of lime, 21.422 of iodide of sodium, 7.57 of bromide of magnesium, 103.2 of carbonate of lime, 35.0 of phosphate of lime, 4.73 of magnesia, and 28.72 of oxide of iron. The efficacy of burnt sponge depends principally upon the presence of iodine, and should always be used when of recent calcination, as it becomes impaired rapidly in consequence of the volatilization of the iodine.

Properties and Uses.—Said to be alterative and antiscrofulous. Used in goitre, scrofulous tumors, and obstinate cutaneous eruptions. Dose, from one to three drachms, mixed with syrup or honey, in the form of an electuary. A pill, which has acquired some considerable reputation in the cure of scrofula, is made as follows: Take of iodine fifty grains; sulphate of morphia ten grains; burnt sponge one hundred grains. Triturate these well together, and into a fine powder, and then form the mixture into a pill mass, by the addition of molasses or other compatible medium, and divide into one hundred pills. To be kept in a dry place. Dose, two or three pills daily.

STAPHYLEA TRIFOLIA.

Bladder-nut.

Nat. Ord.—Celastraceæ. *Sex. Syst.*—Pentandria Trigynia.

THE BARK OF THE ROOT.

Description.—This is a handsome shrub, from six to ten feet in height, with greenish, striped branches. The leaves are opposite, ternate; the leaflets oval-acuminate, serrate, pale beneath, with scattered hairs. The flowers are white, or yellowish-white, half an inch long, and in a short, pendulous raceme, terminating the branchlets. The calyx is composed of five, colored, persistent sepals; the petals are five, ciliate below; the fruit is ovate. When in flower, if the germ be cut transversely and examined, it will appear two or three-celled, and will contain the rudiments of fifteen or twenty seeds; but when the fruit is ripe, it consists

of two or three inflated, adnate, submembranous capsules, which are three-sided, three-parted at top, three-celled, and contain several hard, small nuts or seeds, with a bony, smooth, and polished testa.

History.—This plant is common to the United States, growing in moist woods and thickets, and flowering in May. By some it has been erroneously called *Swamp-Dogwood*. The bark of the root is the officinal part, and has a pleasant, bitter taste. It yields its properties to water. No analysis has yet been made of this new Eclectic medical agent.

Properties and Uses.—Practitioners must be careful to distinguish this bark from that of the *Ptelea Trifoliata*, with which it is frequently confounded, although there is but little resemblance between them; the *Staphylea* being a thin, hard bark, free from any oily taste or smell. Prof. I. G. Jones states that this bark is a pure, unirritating tonic, having rather a soothing influence when applied to irritated mucous membranes. He has employed it advantageously in convalescence after fevers, and in debility connected with gastro-enteric irritation. It promotes the appetite, enables the stomach to endure suitable nourishment, favors the early re-establishment of digestion, and will be tolerated by the stomach, when other tonics are rejected. He employs it in cold infusion, of which half a fluidounce may be given every two, three, or four hours, according to circumstances. It is also said to cure intermittent fever, and is considered by some to be equal to quinia. An extract may be made of the bark of the root, and will be found valuable as a tonic; the dose of which is from three to five grains.

Off. Prep.—Infusum *Staphyleæ*.

STATICE CAROLINIANA.

Marsh Rosemary.

Nat. Ord.—Plumbaginaceæ. *Sex. Syst.*—Pentandria Pentagynia.

THE ROOT.

Description.—By some botanists this plant is considered as a mere variety of the *Statice Limonium* of Europe, but the difference consists in the American plant having flat-margined and cuneiform leaves, while in the European species the leaves are oblong with undulated margins, and the flowers much larger. *Statice Caroliniana* is also known by the names of *Sea-Lavender*, *Ink-root*, etc.; it is an indigenous maritime plant, with a perennial, large, fleshy, fusiform or branched root, of a brownish color, which sends up annually a scape and leaves. The leaves are all radical, petiolate, erect, smooth, mucronate, entire, and veinless. The scape is round, smooth, terete, from six to eighteen inches in height; paniculate above, divisions alternate, bearing unilateral spikes of small, bluish-purple, somewhat sessile flowers, each with two scaly mucronate bracts. The calyx is funnel-shaped, five-toothed, five-angled,

the angles ciliate; *corolla* deeply five-cleft, divisions spatulate, obtuse, longer than the calyx. *Stamens* five, inserted on the claws of the corolla; *anthers* heart-shaped. *Ovary* superior, small, and obovate, supporting five styles shorter than the stamens. *Fruit* or *seed* oblong, invested with the persistent calyx.

History.—Marsh rosemary is found along the seacoast in marshy situations from Maine to Florida, flowering from August to October. The officinal part is the root, which is large, fusiform or branched, heavy, fleshy, and of a reddish or purplish-brown color; it is inodorous, but has a saltish, extremely bitter and astringent taste. It imparts its virtues to alcohol, and more readily to boiling water. Mr. E. Parrish found it to contain about 12 per cent. of tannic acid, some gum, extractive, albumen, resin, volatile oil, caoutchouc, lignin, coloring matter, and various salts.

Properties and Uses.—Marsh Rosemary is a powerful astringent, and in some sections of the country is very much used in diseases of the bowels, in the form of infusion or decoction. It has proved efficacious in diarrhea, dysentery, etc., in which diseases it is only suited to the latter stages, where a tonic and astringent action is required. The infusion, employed as a gargle in affections of the throat, scarlatina anginosa, and as a wash in aphthous and ulcerated sore-mouth, has been very highly recommended. Externally, the powdered root may be applied to old ulcers, or made into an ointment, as a soothing application for piles. The decoction is likewise very useful as an injection in chronic gonorrhea, gleet, leucorrhea, prolapsus ani and uteri, and in some ophthalmic affections. It may be used in all cases where astringents are indicated.

The *Statice Limonium*, of Europe, is possessed of the same powers, but in a less degree. The infusion may be given in doses of from half a fluidounce to two fluidounces, every two, three, or four hours.

STELLARIA MEDIA.

Chickweed.

Nat. Ord.—Caryophyllaceæ. *Sex. Syst.*—Decandria Trigynia.

THE PLANT.

Description.—This plant is the *Alsine Media* of Linnæus; it is an annual or biennial weed, from six to fifteen inches in length, with prostrate, branched, brittle, round, jointed, and leafy stems, distinguished by the alternate, lateral, hairy lines, extending from joint to joint. The leaves are ovate, ovate-cordate, and glabrous, the lower on hairy petioles. The flowers are small and white, in forked cymes; petals two-parted, shorter than the calyx. *Stamens* varying, three, five, or ten.

History.—This is a common plant throughout the United States, growing in fields and around dwellings, in moist, shady places, probably

introduced from Europe; it flowers from the beginning of spring to the end of autumn. The seeds are eaten by poultry and birds. The whole herb is used, when recent.

Properties and Uses.—Chickweed appears to be a cooling demulcent. I have seen the fresh leaves bruised and applied as a poultice to indolent, intractable ulcers on the leg, of many years standing, with the most decided and immediately beneficial results; to be changed two or three times a day. In acute ophthalmia, the bruised leaves will likewise be found a valuable application. An ointment made by bruising the recent leaves in fresh lard, may be used as a cooling application to erysipela-tous and other forms of ulceration, as well as in many forms of cutaneous disease.

STILLINGIA SYLVATICA.

Queen's Root.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Monœcia Monadelphica.

THE ROOT.

Description.—This plant is also known by the name of *Queen's Delight*, *Yaw-root*, and *Silver-leaf*; it is an indigenous perennial, with herbaceous stems two or three feet high. The leaves are alternate, sessile, oblong or lanceolate-oblong, obtuse, serrulate, tapering at the base, and accompanied with stipules. The male and female flowers are distinct upon the same plant; they are yellow, and arranged in the form of a spike, of which the upper part is occupied by the male, and the lower by the female flowers. The male florets are scarcely longer than the bracteal scales.

History.—This plant is found growing in pine-barrens and sandy soils from Virginia to Florida, and in Mississippi and Louisiana, flowering from April to July. When wounded, the plant emits a milky juice. The root, which is the officinal portion, is large, thick, and woody, in long cylindrical pieces, from one-third of an inch to more than an inch thick, wrinkled when dried, externally of a dirty yellowish-brown color, and exhibiting, when cut across, an interior soft, yellowish, ligneous portion, surrounded by a pinkish-colored bark. It has a slight, peculiar, somewhat oleaginous odor, which is strong and acrimonious in the recent root, and the taste is bitterish and pungent, leaving an impression of disagreeable acrimony in the mouth and fauces. It imparts its virtues to water or alcohol, and deteriorates in activity by age. Its properties appear to be owing to a very acrid oil. It also contains resin, woody fiber, coloring matter, extractive, etc.

The *Oil of Stillingia*, so called by its manufacturers, is more properly an alcoholic fluid extract; it is composed of about forty per cent. of oil, with the remainder consisting of extractive, resin, etc. It is prepared

by adding alcohol 95 per cent. to the recent root of *Stillingia*, and making a saturated tincture; then distil off the alcohol. The residue is the preparation sold and used as the oil of *Stillingia*. Upon standing for a length of time, a flocculent deposit takes place, of a reddish-brown character. A similar preparation is made with ether by displacement and evaporation; it forms a more consistent liquid, probably holding more fixed oil. The above oil or alcoholic fluid extract of *Stillingia*, is of a dark brownish-red color, of a strong, peculiar, not unpleasant odor, and of a faint taste at first, but in a short time followed by exceeding pungency and acidity, very persistent in its character, and which is especially felt in the throat and fauces, being accompanied with a very unpleasant sensation in the stomach, if swallowed. The recent root affords a larger quantity of oil, than when old, probably, because the oil becomes oxidized and changed to resin by age, and is no longer soluble in ether, although the real active principle of the article is but little impaired. I have seen a preparation, called *Stillingin*, purporting to have been prepared by the Franklin Pharmaceutical Institute of the City of New York, sold for one dollar per ounce. It was, undoubtedly, the above oil, triturated with sugar or sugar of milk, and the whole cost of which would not exceed twenty cents.

Properties and Uses.—*Stillingia* in large doses is emetic and cathartic, producing in many instances, a peculiar, disagreeable burning sensation in the stomach, or some portion of the alimentary canal, accompanied with more or less prostration of the system. In small doses it is an alterative, exerting an influence over all the secretions which is unsurpassed by any other known alteratives. It is an Eclectic remedy of much importance and value, and is extensively used in all the various forms of primary and secondary syphilitic affections, in which it appears to have almost a specific action, also in scrofulous, hepatic, and cutaneous diseases, in which its administration is followed by the most successful results. In the form of fluid extract, combined with oils of anise or caraway it has been found very beneficial in chronic laryngeal and bronchial affections, and in leucorrhea. Small pieces of the recent root, chewed occasionally through the day, have effectually and permanently cured laryngitis and bronchitis. The oil is entirely too acrid for internal use, unless it be well incorporated with some mucilaginous or saccharine substance; and, for internal use, the fluid extract, or syrup, will be found sufficiently energetic and efficacious. But as an external stimulating application, the oil will be found very valuable in many instances. One drop of it placed upon the tongue, and repeated three or four times a day, is reputed to have proved successful in cases of severe croup. The dried root is inert or nearly so, hence its powder is of no utility. Dose of the tincture, from half a fluidrachm to a fluidrachm; of the decoction, one or two fluidounces. This article is reputed to have formed an ingredient of Swaim's Panacea; such is not the case.

Off. Prep. — Extractum Stillingiæ Hydro-alcoholicum; Extractum Stillingiæ Fluidum; Linimentum Stillingiæ Compositum; Pilulæ Phytolaccae Compositæ; Syrupus Stillingiæ; Syrupus Stillingiæ Compositus; Tinctura Stillingiæ.

STRYCHNOS NUX VOMICA.

Nux Vomica.

Nat. Ord. — Apocynaceæ. *Ser. Syst.* — Pentandria Monogynia.

THE SEEDS.

Description. — This is a middle-sized tree, with a short, crooked, thickish trunk, irregularly branched, and covered with a smooth, ash-colored bark; the young shoots are deep green, and highly polished. The *wood* is white, hard, close-grained, and bitter. The *leaves* are opposite, on short petioles, oval, shining, smooth on both sides, entire, from an inch and a half to four inches in length, from one to three inches broad, and from three to five-nerved. The *flowers* are small, greenish-white, funnel-shaped, and are collected into small terminal cymes, with a disagreeable odor. The *calyx* is five-toothed; the *corolla* is also five-parted. *Filaments* scarcely any or exceedingly short, inserted over the bottom of the divisions of the corolla; *anthers* oblong, half within the tube, and half without. The *ovary* is superior, roundish, two-celled, with many ovules in each cell, attached to the thickened center of the partition. *Style* as long as the tube of the corolla; *stigma* capitate. The *fruit* is a berry, round, about the size of a large apple, and covered with a smooth, hard rind, of a rich orange color when ripe, and filled with a white, soft, gelatinous pulp, in which are five seeds; these are flat, round, with a prominence in the center, of a grayish color externally and covered with a woolly substance, but internally hard and tough like horn.

History. — The Nux Vomica tree is a native of the East Indies, abounding particularly on the Malabar and Coromandel coasts. The wood is exceedingly bitter, especially that of the root, which is said to cure intermittent fevers, and the bites of venomous snakes. The pulp of the fruit is greedily eaten by various birds. The *Lignum Colubrinum* or *Snake-wood*, which is generally referred to the *Strychnos Colubrina*, is frequently nothing else than the nux-vomica wood. The bark contains a large proportion of brucia, and some strychnia, and is said to be identical with the False Angustura Bark. The officinal part of the plant is the seeds.

Nux Vomica seeds are circular, about nine lines in diameter, and two in thickness, flat and slightly concave on one side and convex on the other, umbilicated at one surface, and everywhere beset with fine short ash-colored, or yellowish-gray satiny hairs, attached to a thin, fragile coating, which closely invests the kernel. This internal nucleus or kernel is whitish and translucent, occasionally dark-colored and opaque,

almost horny, exceedingly tough, very difficult to pulverize, and of an intensely bitter taste. To powder them, the method recommended is to soften them well with steam, then slice them, and dry them ; after which they are ground to powder. The powder has a grayish-yellow color, a faint, sweet odor, and an intense, durable, bitter taste. Water or proof spirit dissolves its active ingredients, but rectified alcohol acts with the most energy. Ether takes up a concrete oil and some wax. Nitric acid renders the powder orange-red. The aqueous decoction is of a pale grayish-yellow color, and intensely bitter, and becomes orange-yellow on the addition of nitric acid, and emerald-green by sesquioxide of iron. Nux Vomica consists of strychnia, and brucia, united with a peculiar acid named *Ignasuric Acid*, concrete oil, wax, yellow coloring matter, soluble gum, starch, and lignin. Strychnia was discovered in 1818 by Pelletier and Caventou, who found it in greater proportion in the bean of St. Ignatius than in the nux vomica. For an account of its preparation and properties, as well as of Brucia, see article *Strychnia*, in the second part of this work.

Properties and Uses.—Nux Vomica is a powerful poison, exerting its influence principally on the cerebral system. In poisonous doses it produces violent tetanic convulsions without impairing the functions of the brain, asphyxia and death. When given in doses sufficiently large to influence the system, a sensation of weight and weakness is experienced, with tremblings in the limbs, and some rigidity on attempting motion. Sometimes there are sudden starts or shocks, more or less frequent and violent, with a tendency to permanent involuntary contraction or rigidity of the muscles. Even in small doses, it will occasionally create a sense of heat in the stomach, constriction of the throat, chest, and abdomen, and retention of urine ; sometimes vertigo, pain in the head, contracted pupil, and dimness of vision are produced ; and, more especially with the corpulent and apoplectic, there will be formication, and tingling upon the surface, with more or less perspiration, slight involuntary spasms of the muscles, and a very disagreeable, dreamy or vague condition of the brain. The pulse may or may not be increased in frequency. Chloroform is said to be beneficial in poisoning by nux-vomica. In small doses it is tonic, and increases the action of the various excretory organs.

Nux Vomica is employed principally in the treatment of paralysis, especially when it is of some standing, and where no hyperæmic or hemorrhagic condition of the nervous centers exist ; it is generally inapplicable to the recent forms, until the removal of the primary affection by antiphlogistic means. Its use is limited to cases in which inflammatory action or congestion has been removed. It is said to be more beneficial in general palsy and paraplegia than in hemiplegia, and has also been found of benefit in local palsies, as of the bladder, likewise in amaurosis, spermatorrhea and impotence. It has also been beneficially

employed in neuralgia, chorea, and obstinate constipation. A small quantity added to cathartics, increases their energy. Dysmenorrhea, dyspepsia, dysentery, rheumatism, hysteria, mania, worms, intermittent fever, enuresis, chronic splenitis, etc., have been successfully treated by the use of this agent. Nux vomica and its alkaloids should always be given with great care, the physician closely observing its effects. The dose of powdered nux vomica is five grains three or four times a day, and gradually increased to ten, or until its effects are experienced. The alcoholic extract is the best form of administration and may be given in doses of from one-fifteenth to one-twentieth of a grain as a tonic; and in paralytic affections from half a grain to two grains in the form of pill, and, as with the powder, gradually increased. The saturated tincture may be given in doses of from five to thirty drops, likewise gradually increased.

Off. Prep.—Extractum Nucis Vomicae; Pilulae Copaibae Compositae; Strychnia; Tinctura Nucis Vomicae.

STYRAX OFFICINALE.

Storax.

Nat. Ord.—Styracææ. *Sex. Syst.*—Decandria Monogynia.

THE CONCRETE JUICE.

Description.—This is a tree from fifteen to twenty-five feet in height, with irregular, round *branches* which are tomentose when young. The *leaves* are alternate, petiolate, entire, elliptical, deciduous, somewhat pointed, bright-green and smooth above, whitish with soft down beneath, and about two inches in length, by one and a half in breadth. The *flowers* are white, and in clusters of three or four, at the ends of the young lateral shoots, with angular pedicels. The *calyx* is hoary, almost hemispherical, rather angular at the base, with five or seven very short marginal teeth; *corolla* white, externally downy, somewhat funnel-shaped, and divided into from five to seven deep, elliptical, obtuse, spreading segments. The *stamens* are ten, placed in a ring; the *filaments* subulate, and inserted into the corolla, with yellow, erect, oblong *anthers*. The *ovary* is ovate, with a slender style and simple stigma. The *fruit* is a downy drupe of a globose form, containing one or two angular nuts, which are concave on one side and convex on the other.

History.—Storax is a native of Syria, Arabia, and other parts of the Levant, and has been naturalized in some of the Southern parts of Europe. The European tree does not yield any of the balsam, which has led some botanists to doubt whether the officinal storax is obtained from it at all. The mode of collecting it in Syria, whether by incisions or by decoction, is not positively known, as the natives make a mystery of their proceedings. There are several kinds of storax in commerce;

the purest is the *storax in grains*, which are about the size of a pea, opaque, soft, adhesive, capable of uniting so as to form a mass, and of a whitish, yellowish-white, or reddish-white color. Another variety, in dry and brittle, amygdaloidal masses, formed of yellowish agglutinated tears, with a brown or reddish matter between them, and wrapped in the leaves of a kind of reed, is called *storax amygdaloide*. Both of the above varieties are free from impurities, and have a pleasant vanilla odor; they are rarely seen in our markets. The *common storax* of the shops occurs in brittle, brown or reddish-brown masses, several pounds in weight, of various shapes, somewhat tenacious, and softening under the teeth; it has an agreeable odor like vanilla or balsam of Peru, and apparently consists of sawdust cemented by a balsamic or resinous substance. When exposed to the air it acquires upon its surface, a whitish efflorescent film of benzoic acid. The cakes or masses may be easily crushed to a coarse powder, in which state it is usually sold in the shops. When good, it yields a brown resinous fluid, with the odor of storax, when compressed between hot plates. In consequence of its impurities, it should be purified by solution in alcohol, strained and then the alcohol distilled off by moderate heat, until the storax acquires the proper consistence. The storax of commerce consists of a trace of volatile oil, a little gum, some extractive matter, much woody fiber, with from 33 to 54 per cent. of resin, and from 1 to 2.6 per cent. of benzoic acid.

Liquid Storax is another variety, and which is the most commonly employed; it is a semifluid adhesive substance, of a slightly greenish-gray color, the surface of which becomes brown or blackish upon exposure to the atmosphere, and of an odor somewhat similar to balsam of Peru, but less agreeable. Its source is not accurately known. Landerer says that liquid storax is obtained from a plant growing in the islands and on the mainland of Greece, which is inodorous, and yields no balsam, except that inhabiting the islands of Cos and Rhodes, which in the flowering season exhales a rich vanilla odor, and yields liquid storax from its bark and young twigs. These are formed into balls, and are subjected to pressure in a heated press, when a gray oily matter is obtained, which is exported pure, or made into cakes with finely powdered olibanum.

Storax has an aromatic and fragrant odor and taste, and yields its active properties to alcohol or ether; water becomes yellow and milky with it, acquiring its odor. A moderate heat fuses it, and a higher temperature inflames it, burning with a white flame, and leaving a light spongy carbonaceous residue. Four hundred and eighty grains of the commercial article, have yielded three hundred and sixty of alcoholic extract. As it yields benzoic or cinnamic acid by distillation, it ranks as a balsam.

Properties and Uses.—Storax is a stimulant, acting more especially upon mucous tissues, as do nearly all balsams. It has been found bene-

ficial as an expectorant in cough, chronic catarrh, asthma, bronchitis, and other pulmonary affections; also in gonorrhea, leucorrhea, and gleet, in which it is as effectual and more pleasant than copaiba. Combined with tallow or lard, it forms a valuable application in many forms of cutaneous disease, especially those common to children, as ringworm, tinea, ringworm of the scalp, etc. It is much used, on account of its fragrance, for compounding ointments and pills, and is an excellent addition to opium in the form of pill, when it is necessary to conceal the taste and smell of this narcotic; three or four grains of storax may be combined with one grain of opium for this purpose. The dose of storax is from ten to twenty grains, gradually increased.

SUCCINUM.

Amber.

History.—The origin of Amber is very uncertain; it is believed to be a fossil resin, the produce of an extinct plant. It may be derived from some resin formerly liquid or soft; or possibly from the slow oxidation of a fatty matter, as we see succinic acid formed from fats by oxidation. It is found chiefly in Prussia, either on the sea-shore or in the alluvial formations along the coast; it is likewise found in Sicily, and in this country in New Jersey and Maryland. It is a brittle solid, generally in small irregular masses, permanent in the air, having a homogeneous texture and vitreous fracture, and susceptible of a fine polish. Its color is either light or deep yellow, and occasionally reddish, or even deep brown. It has no taste, and is inodorous, unless heated, when it exhales a peculiar, aromatic, not unpleasant smell. It is usually translucent, though occasionally transparent or opaque, and is found chiefly associated with lignite, sometimes iron pyrites, and frequently contains insects and fragments of vegetables imbedded in it. By friction it becomes negatively electric. Its specific gravity is 1.07. It is for the most part insoluble in all menstrua. Heated in the open air it softens; at 548° it melts, swells, and burns with a yellow flame, leaving a small portion of ashes. Subjected to distillation in a retort furnished with a tubulated receiver, it yields first a yellow acid liquor, which is a solution of impure *succinic acid*; and afterward a thin yellowish oil, with a yellow waxy substance, which is deposited in the neck of the retort and the upper part of the receiver. The oil obtained is called the Oil of Amber, *Oleum Succini*. The waxy matter, exhausted by cold ether of the portion soluble in that menstruum, is reduced to a yellow micaceous substance identical with *Chrysene*, and from which a white crystalline body may be separated by boiling alcohol, identical with the solid carbo-hydrogen *Idrialine*, and called by its discoverers *Succisterene*. Both have the same composition, and color sulphuric acid intensely blue, forming a coupled acid. *Chrysene* is insoluble in most liquids, melts at 455° and

is likewise a carbo-hydrogen. As the distillation of amber proceeds, a large quantity of combustible gas is given off, which must be allowed to escape from the tubulure of the receiver. As the heat continues, the oil gradually deepens in color, until it finally becomes black and of the consistence of pitch. Amber repeatedly distilled from nitric acid, yields an acid liquor, from which, after it has been neutralized by caustic potassa, ether separates pure camphor. Camphor may likewise be obtained by distilling to dryness powdered amber with an extremely concentrated solution of caustic potassa. When the acid crystals form, when amber is subjected to distillation, they may be obtained by compressing them in bibulous paper, and subliming them a second time; these crystals of succinic acid were formerly called *Salt of Amber*, and were much esteemed as a diuretic.

Amber consists of a small quantity of fragrant volatile oil; a yellow resin, intimately united with a volatile oil, very soluble in alcohol, ether, or the alkalies, easily fusible, and resembling ordinary resins; another resin, also combined with volatile oil, soluble in ether or the alkalies, sparingly soluble in cold, but more soluble in boiling alcohol; succinic acid; a bituminous principle, having some analogy to the lac-resin of John, insoluble in alcohol, ether, or the alkalies, and constituting more than four-fifths of the amber; also a strongly odorous, bright-yellow substance, which hardens by time. Its elementary composition is, carbon 80.59, hydrogen 7.31, oxygen 6.73, ashes (silica, lime, and alumina) 3.27=97.90.

Properties and Uses.—Amber is not used as a medicine in the present day, being employed only in pharmacy and the arts. It is used to prepare succinic acid and oil of amber. In the arts it is made into ornaments, and prepared in making varnishes, for which latter purpose it is first subjected to the process of roasting, whereby it is rendered soluble in a mixture of linseed oil and oil of turpentine, forming amber-varnish.

Off. Prep.—Oleum Succini; Oleum Succini Rectificatum.

SULPHUR.

Sulphur.

SULPHUR SUBLIMATUM.

Sublimed Sulphur. Flowers of Sulphur.

SULPHUR LOTUM.

Washed Sulphur.

History.—Sulphur is an abundant natural production, occurring principally in volcanic districts, especially in Sicily, where it may be obtained in a state of purity, and often crystallized. It is also very generally disseminated throughout the mineral kingdom in combination with gypsum, heavy-spar, and many other minerals, with oxygen as sulphuric

acid, with hydrogen as sulphureted hydrogen, with mineral waters, and with the metals, especially lead, iron, copper, quicksilver, etc., forming with them compounds called sulphurets or sulphides. It is almost always present in minute quantity in animal and vegetable matter, especially in mustard and other cruciform plants; indeed it is an essential ingredient of vegetable and animal fibrine, albumen, and caseine, and as such is indispensable to vegetation and to animal life. When found in a native state, it is in masses, translucent or opaque, or in the powdery form, mixed with various earthy impurities.

For supplying the wants of medicine and the arts, sulphur is obtained from two sources; one, imported from Sicily, and known as *Native* or *Volcanic Sulphur*, the other, prepared from the sulphurets of iron or copper, and known as *Pyritic Sulphur*, which is seldom employed in medicine. *Volcanic sulphur* occurs in masses or crystals; the crystallized variety presents the form of very acute rhombic octaëdres, bright sulphur-yellow in color, and exceedingly pure. The massive sulphur, has a grayish-yellow tint, rather less brittle and less lustrous than the preceding, with many grayish or bluish spots or streaks, arising from mineral impurities. From the volcanic sulphur, pure sulphur is prepared by distillation. *Crude sulphur* is prepared by distillation of sulphur from the sulphur earths; this, when purified by being again melted, allowing the impurities to settle, and then pouring the purer sulphur into cylindrical molds about an inch in diameter, forms the *Roll Sulphur* or *Cane Brimstone* of commerce; and the residue of this process, ground to powder, being a very impure sulphur, of a gray color, is known by the name of *Sulphur Vivum* or *Horse Brimstone*. *Roll sulphur* is now made by subliming the sulphur in iron vessels, fusing the product, and casting it into cylindrical molds.

The best mode of purification is to sublime the sulphur, pass the sublimed vapor into a close chamber of considerable size, where it condenses in fine impalpable powder, consisting of minute globules between a thirtieth and a two-hundredth of an inch in diameter, unless they have been exposed to light or agitation, when they are apt to present a crystalline structure. This is called *Flowers of Sulphur* or *Sublimed Sulphur*. *Washed Sulphur* is the sublimed sulphur thoroughly washed with water to free it from the acidity which is apt to be present, in consequence of the combustion some of it undergoes in the act of subliming, thereby giving rise to sulphuric acid. When properly washed, it undergoes no change by exposure to the atmosphere.

Crude sulphur is imported to this country principally from Sicily and the ports of Italy. Roll sulphur and the flowers of sulphur generally come from Marseilles. Sulphur is an elementary, non-metallic, brittle solid, of a pale-yellow color, permanent in the air, and exhibiting a crystalline texture and shining fracture, with a perceptible smell when rubbed, and a faint peculiar taste. It is a bad conductor of heat, and

becomes negatively electric by friction. When pure its specific gravity is 1.99; when impure it may be as high as 2.35. Its equivalent number is 16, and its symbol S. It is insoluble in water, but soluble in petroleum, alkaline solutions, the fixed and volatile oils, and when finely powdered in alcohol or ether. It begins to volatilize at about 180° , giving off its peculiar odor, and when heated to between 224° and 230° , it passes into a state of fusion; about 400° , or a little higher, the melted mass becomes thicker and brownish; and if kept for some time at this temperature, or suddenly cooled by being poured into cold water, it forms for a short while afterward a soft, tough mass, called *Amorphous Soft Sulphur*, which is capable of receiving and retaining delicate impressions of seals, coins, and the like. At 650° it sublimes unchanged, if oxygen be excluded; in open vessels, sulphur, when inflamed, burns with a lambent blue flame, combining with the oxygen of the air, and giving rise to highly suffocating vapors of sulphurous acid gas. As a chemical, sulphur is exceedingly important, its combinations being numerous, and among the most powerful agents of chemistry.

Sulphur, from carelessness in its purification, may contain sulphuric acid, from which it should always be freed; this may be detected by agitating some of the sulphur in water, and testing the water with litmus paper. It is sometimes adulterated with arsenic, which may be detected by converting the sulphur and arsenic into sulphuric and arsenic acids, through the action of nitric acid and heat, neutralizing the acids by carbonate of soda, adding muriatic acid in excess, and transmitting sulphureted hydrogen for some minutes; upon which yellow sulphuret of arsenic will fall down.

Properties and Uses.—Sulphur is a stimulant, laxative, diaphoretic, alterative, and in regard to scabies, it is considered a specific. It is used in hemorrhoids, diseases of the bladder, and in pregnancy, as a mild cathartic, either alone, combined with cream of tartar, or with some other saline purgative. It is given alone in one or two drachm doses, in milk or molasses; or thirty grains of sulphur combined with two drachms of bitartrate of potassa. One serious objection to its use is, that it renders the stools, and even the insensible transpiration, insupportably fetid; which arises from its being converted within the body into sulphureted hydrogen; if the sulphur contains acid, its operation will be attended with more or less griping. The soda of the bile is supposed to render the sulphur soluble. In chronic catarrh, chronic rheumatism, cutaneous diseases, and in the chronic stage of pertussis, it may be administered two or three times a day, in doses of twenty or thirty grains.

Externally, sulphur is used in various cutaneous diseases of the vesicular, scaly, or papular kind. Sulphur-baths are likewise found beneficial in scrofula, chronic palsy, chronic rheumatism, scabies, and all kinds of scaly cutaneous disorders; the sulphurous acid gas is applied

to the body, the head being protected. The effects occasioned are warmth, redness, and pricking of the integuments, followed by considerable sweating and excitement of the circulation. If the gas should be inhaled, it will prove powerfully irritating to the glottis, and altogether irrespirable, even when diluted with atmospheric air. The effects of sulphur, and of sulphurous acid in cutaneous diseases and rheumatism may be obtained by using the sulphuret of potassa in the form of bath, say two or three ounces to one hundred pounds of water.

Off. Prep. — *Confectio Sennæ Composita*; *Ferri Sulphuretum*; *Potassæ Sulphas cum Sulphure*; *Potassii Sulphuretum*; *Sulphur Præcipitatum*; *Unguentum Sulphuris*; *Unguentum Sulphuris Compositum*; *Vinum Cinchonæ Compositum*.

SYMPHYTUM OFFICINALE.

Comfrey.

Nat. Ord.—*Boraginaceæ*. *Sex. Syst.*—*Pentandria Monogynia*.

THE ROOT.

Description.—*Comfrey* has an oblong, fleshy, perennial root, black externally, and a pilose, herbaceous stem, three or four feet high, branching above, and winged by the decurrent bases of the pointed, wavy, rough-edged leaves; the lower leaves and radical are ovate-lanceolate, tapering into a petiole; the upper and floral lanceolate. The flowers are white or of a rose color, and disposed in terminal, revolute racemes. The calyx is five-parted, with lanceolate, acuminate sepals; the corolla tubular-campanulate; limb with five recurved teeth. Stamens five, included; anthers elongated. Style filiform. Nutlets smooth, ovate, fixed by a large excavated (perforate) base. The whole plant is rough with dense hairs.

History.—This is a European plant, much cultivated in our gardens for medical uses, and flowering through the summer. The root is the officinal part; it is spindle-shaped, branched, sometimes more than an inch thick and a foot long, externally smooth and blackish, internally white, fleshy, and juicy, containing much mucilage. When dried it becomes wrinkled, of a firm, horny consistence, and of a dark color within. It is nearly inodorous, and has a mucilaginous, feebly astringent taste. It contains a small quantity of tannin, and a great abundance of mucilage, which it yields to water.

Properties and Uses.—This plant is demulcent and slightly astringent. With other mucilaginous agents, it is considered inert or of but little medical importance by many writers; but this is an erroneous view, the result of deficient investigation. All mucilaginous agents exert an influence on mucous tissues, hence the cure of many pulmonary and other affections, in which these tissues have been chiefly implicated, by their

internal use. Physicians must not expect a serous disease to yield to remedies which act on mucous membranes only ; and to determine the true value of a medical agent, they must first ascertain the true character of the affection, as well as of the tissues involved. Again, mucilaginous agents are always beneficial in scrofulous and anæmic habits. Comfrey root is very useful in diarrhea, dysentery, coughs, hemoptysis, other pulmonary affections, leucorrhea, and female debility ; these being principally mucous affections. It may be boiled in water, wine, or made into a syrup, and taken in doses of from one to four fluidounces of the preparation, two or three times a day. Externally, the fresh root, bruised, forms an excellent application to bruises, ruptures, fresh wounds, sore breasts, ulcers, white swellings, etc.

Off. Prep.—Syrupus Araliæ Compositus ; Vinum Symphytii Compositum.

SYMPLOCARPUS FÆTIDUS.

Skunk Cabbage.

Nat. Ord.—Araceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE ROOT AND SEEDS.

Description.—This plant has been a difficult one for Botanists to arrange ; thus Willdenow attached it to the genus *Dracontium* ; Michaux and Pursh to that of *Pothos*, and Bigelow to *Ictodes*. Nuttall calls it *Symplocarpus*, which is adopted by many botanists, and which we deem it best to retain. It is a very curious plant, having a large, abrupt, perennial root or tuber, with numerous verticillate, fleshy fibers, which penetrate to the depth of two or more feet. The spathe appears before the leaves, and is ovoid, roundish, cucullate, turgid, various in width, spotted and sometimes nearly covered with brownish-purple blotches, varied with red, yellow, and green, the top acuminate and incurved, the edges folded inward, auriculate at base, and at length coalescing. Within the spathe, the flowers, which resemble it in color, are placed in great numbers upon a globose, pedunculate, simple spadix, for which they form a compact covering. The flowers are tessellately imbricate, adnate. The calyx is composed of four fleshy, cuneate, truncate sepals, the top and edges inflected, at length becoming very thick. Corolla none. Stamens four, opposite the sepals, with subulate filaments, equal in length to the calyx, and oblong, exserted, two-celled anthers. The style is four-sided, tapering ; stigma minute, pubescent ; ovary roundish, concealed within the spadix. After the spathe decays, the spadix continues to grow, and with it every part of the flowers except the anthers. When the fruit is ripe, the spadix has attained many times its original dimensions, while the calyx, filaments and style are larger, very prominent and separated from each other. Within the spadix, at the base of each style,

is a naked, round, fleshy seed, as large as a pea, white, tinged with green and purple, invested with a separate membranous coat, and with a prominent embryo situated in a depression at top, and umbilicately attached to a large, solid perisperm. Sometime after the flowers, numerous, large, crowded *leaves* appear, which are oblong, cordate, acute, smooth, with numerous fleshy veins of a pale color, on long, channeled petioles, furnished with large oblong sheaths, bright-green, and often twenty inches long by twelve broad.

History.—This is an indigenous plant, growing abundantly in various parts of the United States, in moist situations, flowering in March and April, and maturing its fruit in August. The whole plant, especially when bruised, emits a very disagreeable alliaceous odor, which has given rise to the several names, *Skunk-weed*, *Skunk-cabbage*, *Polecat-weed*, and *Meadow-cabbage*. The root is the officinal part, and should be collected in autumn or early in spring, and dried with care. It has a disagreeable, fetid odor, and an acrid taste. When properly dried and whole, it is cylindrical, or in the shape of a truncated cone, two or three inches long, by about an inch in thickness, dark-brown externally, and very rough from the insertion of radicles, internally white and amylaceous. When in transverse slices, they are of various lengths, about as thick as a quill, very much flattened and wrinkled, white within, and covered by a yellowish reddish-brown epidermis, considerably lighter colored than the body of the root. Drying lessens the odor, as well as the acrimony of the plant, and age and exposure dissipate them entirely, consequently the root should be renewed annually. The seeds are frequently used and preferred, as being more energetic than the root; they have an exceedingly acrid taste, and emit the peculiar odor of the plant, only when bruised. They preserve their virtues longer than the root. The properties of this plant chiefly depend upon a volatile principle, which is materially diminished by drying, and is entirely dissipated by heat. Alcohol or water extracts its virtues, and the aqueous infusion should be made by displacement. The roots and seeds contain volatile fatty matter, volatile oil, fixed oil, of which the seeds yield twenty per cent., starch, etc.

Properties and Uses.—In large doses, Skunk-cabbage will occasion nausea, vomiting, headache, vertigo, and dimness of sight. In medicinal doses, it is stimulant, antispasmodic, expectorant, and slightly narcotic. It has been successfully used in asthma, hooping-cough, nervous irritability, hysteria, epilepsy, and convulsions attending pregnancy and parturition; likewise in chronic catarrh, pulmonary, and bronchial affections. The powdered root or seed may be given in doses of from ten to forty grains, three times a day; but the most eligible mode of administration is a saturated tincture of the fresh root, of which one or two fluidrachms may be given for a dose.

Off. Prep.—Pulvis Lobeliæ Compositus; Pulvis Asclepiæ Compositus; Tinctura Symplocarpi; Tinctura Lobeliæ Composita; Tinctura Lobeliæ et Capsici; Tinctura Sanguinariæ Composita; Tinctura Sanguinariæ Acetata; Tinctura Viburnii Composita.

TAMARINDUS INDICA.

Tamarind.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Monadelphia Triandria.

THE PRESERVED FRUIT.

Description.—This is a large tree, with numerous spreading *branches*, and an erect, thick *trunk*, covered with a rough, ash-colored *bark*. The *leaves* are alternate and pinnate, consisting of many pairs of opposite leaflets, which are subsessile, entire, obtuse, elliptic-oblong, unequal at the base, about six lines long by two broad, smooth on both sides, and of a yellowish-green color; the *petioles* are from four to six inches long, and channeled; *stipules* small, deciduous. The leaflets close in the evening, or in cold, moist weather, like those of the sensitive plant. The *flowers* are in simple, lateral and terminal racemes; the *calyx* is four-leaved, cruciate, expanding, deciduous, somewhat tubular at base, bilabiate, the upper-lip tri-partite, the lower broad, two-toothed. The *corolla* is somewhat papilionaceous, erect, unilateral, the length of the calyx. The *vexillum* or *middle petal* is oblong, its margins involute and curled; wings oval, margins curled; all three are beautifully variegated with red and yellow; *Keel* two short subulate processes under the stamens. The *stamens* are ten, of which seven are very short and sterile, and three long, purplish, curved, united at base, bearing large, ovate, incumbent *anthers*. The *ovary* is oblong, compressed, incurved, and supports a subulate *style* with an obtuse *stigma*. The *legume* is oblong, compressed, one-celled, two to twelve seeded, filled with a firm, acid pulp, covered with a hard, scabrous bark, which never separates into valves; under the bark run three fibers, one down the upper concave margin, and the other two at equal distances from the inferior or convex edge. *Seeds* from six to twelve, somewhat trapeziform, compressed, covered with a smooth, hard, brown shell, and inserted into the convex side of the pericarp.

History.—The Tamarind tree grows in the East and West Indies, Egypt, and Arabia. The fruit is the officinal portion; in the recent state they have an agreeable, sour taste, without any mixture of sweetness. As usually obtained, they are in the preserved state, made by placing the pods previously deprived of their shell, in layers in a cask, and then pouring boiling syrup over them; thus prepared, they form a dark-colored adhesive mass, consisting of syrup mixed with the pulp, membranes, strings and seeds of the pod, and of a sweet acidulous taste.

The seeds should be hard, clean, and not swollen, the strings tough and entire, and the odor without mustiness. The presence of copper may be ascertained by the reddish coat imparted to the blade of a knife which has been immersed in the tamarinds. According to an old analysis by Vauquelin, they contain a little sugar, pectic acid, and parenchymatous fiber, with 9.4 per cent. of citric acid, 1.5 of tartaric acid, 0.5 of malic acid, and 3.25 of bitartrate of potassa. It readily parts with its properties to water.

Properties and Uses.—Tamarinds are laxative and refrigerant, and infused in water form a grateful drink in febrile diseases. During convalescence, the addition of the pulp to the patient's diet, is not only agreeable, but tends to keep the bowels in a soluble condition. A convenient cooling laxative is Tamarind-whey, made by boiling an ounce of the pulp in a pint of milk, and straining the product. Combined with senna, or resinous cathartics it is said to weaken their purgative power. Dose, from a drachm to two ounces.

TANACETUM VULGARE.

Tansy.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE HERB.

Description.—Tansy has a perennial, moderately creeping *root*, and an erect, herbaceous, obscurely hexagonal, leafy, solid, striated, smooth *stem*, two or three feet in height, and branched above into a handsome corymb of flowers. The *leaves* are smoothish, dark-green, doubly and deeply pinnatifid; the *segments* are oblong-lanceolate, pinnatifid and incisely serrate; the margined *petiole* cut-toothed. The *flowers* are golden yellow, and arranged in dense, terminal, many-headed, fastigiate corymbs; each flower is composed of numerous florets, of which those constituting the disk are perfect and five-cleft, those of the terete rays, very few, pistillate, and trifold. *Scales of the involucre* scarious at the apex, small, obtuse, imbricated. The *pappus* short, equal, membranous, five-lobed; *achenia* with a quadrangular entire crown. There is a variety called *Double Tansy*, *Tanacetum Crispum*, with crisped and dense leaves.

History.—Tansy is a native of Europe, extensively cultivated in the gardens of this country, and likewise found growing wild in the roads and old fields, flowering from July to September. The whole herb is officinal; it has a strong, peculiar, and fragrant odor, but which is disagreeable to some, and a warm, aromatic, bitter, and somewhat acrid taste. Its odor is much diminished by drying. It imparts these properties to alcohol, or boiling water in infusion, and which depend on bitter extractive, and a greenish-yellow volatile oil which has the flavor of the

plant, is lighter than water, and deposits camphor upon standing. According to analysis, the leaves contain volatile oil, in greater proportion than in the seeds, fixed oil, wax or stearin, chlorophylle, yellow resin, yellow-coloring matter, tannic and gallic acids, bitter extractive, in less proportion than in the seeds, gum, lignin, and a peculiar acid called tanacetie, which precipitates lime, baryta, oxides of lead, and copper.

Properties and Uses.—Tansy is tonic, emmenagogue and diaphoretic. In small doses, the cold infusion will be found useful in convalescence from exhausting diseases, in dyspepsia with troublesome flatulence, hysteria, jaundice, and worms. A warm infusion is diaphoretic and emmenagogue, and has been found beneficial in intermittent fever, suppressed menstruation, tardy labor-pains, and as a preventive of the paroxysms of gout. The seeds are reputed the most effectual as a vermifuge. The oil is likewise used as an anthelmintic, and as an abortive; but for this last purpose it is highly dangerous. Tansy is much employed in the form of fomentation to swellings and tumors, local inflammations, etc., and applied to the bowels in amenorrhea, and painful dysmenorrhea. The vinous infusion is said to be beneficial in strangury, and other urinary obstructions, and in debility of the kidneys. The dose of the powder is from thirty to sixty grains, two or three times a day; of the infusion, from one to four fluidounces; of the tincture, one or two fluidrachms; of the oil, from two to ten drops.

Off. Prep.—Infusum Tanacetii; Tinctura Laricis Composita.

TARAXACUM DENS-LEONIS.

Dandelion.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE ROOT.

Description.—This plant is placed in the Natural Order *Cichoraceæ* by Lindley, and is the *Leontodon Taraxacum* of Linnæus. It is a herbaceous plant, with a perennial, fusiform, fleshy, whitish, milky root, covered with a brown epidermis. The leaves are radical, sessile, numerous, runcinate, toothed, smooth, of a fine green color, and spreading. The scape or flower-stem rises from the midst of the leaves, six inches or more in height; it is erect, round, naked, smooth, brittle, fistulous, and terminated by a single head of flowers of a golden-yellow color, which expand in fine weather and in the morning only, and close in the evening; the heads are about an inch and a half wide. The involucre is imbricated, oblong, and double; the exterior scales being linear-oblong, appressed, spreading, and reflexed; the inner are in a single series, larger and erect. The florets are numerous, equal, ligulate, truncated, and five-toothed. The stamens have capillary filaments with conjoined anthers. The ovary is obovate, crowned with a slender, cylindrical style,

with two revolute stigmas. The *receptacle* is convex, naked, and punctate. The *achenia* are solitary, oblong, and supporting a simple, radiated pappus on a long pedicel. After blossoming the inner involucre closes for a time, the slender beak elongates and raises up the pappus while the fruit is forming, the whole involucre is then reflexed, exposing to the wind the naked fruits with the pappus displayed in an open globular head nearly two inches in diameter.

History.—This plant grows spontaneously in most parts of the globe, in fields, grass-plats, and along roadsides, flowering from the commencement of spring to late in the autumn. There are several species named by Botanists, but which appear to be mere varieties of this one, and which possess the same physical characters. The young leaves are much used as a salad or greens. The whole plant abounds in a milky, bitter juice, whose sensible qualities are said to be greater just before inflorescence. The root is the officinal part, and yields its properties to boiling water; it should be collected in the months of July, August, and September. When recent, it is several inches in length, from a quarter of an inch to three-quarters of an inch thick, round, tapering, somewhat branched, brownish, or brownish-yellow externally, whitish internally, with a yellowish ligneous cord running through its center, and abounding in a milky juice. On drying, it loses more than half its weight, and becomes shrunk, wrinkled longitudinally, brittle, with a shining, somewhat resinous fracture. It is inodorous, with a sweetish, herbaceous, mucilaginous, bitter taste. The milky juice has been found on analysis to contain gum, bitter extractive, gluten, caoutchouc, saline matters, a trace of resin, and a free acid; beside which, the root contains starch and saccharine matter. When changed by exposure, mannite has been obtained. M. Pollex has obtained *Taraxacin* by boiling the milky juice of the root in distilled water, which removes albumen and resin; filter the liquid, concentrate, and allow it to evaporate spontaneously in a warm place. The taraxacin forms in crystals, and may be purified by repeated solution and crystallization in alcohol or water. It is in stellated and dendritic masses, bitter, and somewhat acrid, neutral, fusible, permanent, very soluble in alcohol, ether, or boiling water, sparingly soluble in cold water. Too long boiling, impairs the virtues of Dandelion root, and which should always be used while recent.

Properties and Uses.—Dandelion root when dried exerts but little therapeutic influence upon the system; but in its recent state it is slightly tonic, diuretic, aperient, and alterative. It is supposed to act especially upon the liver, proving effectual in torpor and chronic engorgements of that organ, as well as of the spleen. It is also reputed useful in dropsical affections depending on an abnormal condition of the abdominal organs, in uterine obstructions, cutaneous affections, and in derangements of the hepatic and digestive systems. Its diuretic and aperient

effect is augmented by the addition of bitartrate of potassa. As far as my own experience with this article goes, I think its virtues have been overrated. The existence of an irritable condition of the stomach or bowels, or acute inflammation contra-indicate its employment. Dose of the decoction one or two ounces; of the extract from five to thirty grains.

Off. Prep.—Decoctum Taraxaci; Extractum Taraxaci; Extractum Taraxaci Fluidum; Pilulæ Taraxaci Compositæ.

TELA ARANEÆ.

Cobweb. Spidersweb.

History.—The medicinal species of spider from which the web is obtained is the *Tegeneria Medicinalis* of this country, which are found in cellars, barns, and other dark places; they are of a brown or blackish color. The web of the field-spider is said to be of no account, medicinally, while that of the house-spider is reputed to possess extraordinary virtues. There are various opinions among medical men as to the *modus operandi* of cobweb, some attributing it entirely to the control of the imagination, while others view it in a different light, and entertain favorable opinions of it as a powerful therapeutical agent.

Properties and Uses.—Febrifuge, sedative, and antispasmodic. Said to have been found useful in the cure of intermittents when all other agents have failed; also recommended in various nervous and spasmodic diseases, for the purpose of controlling and tranquilizing irregular nervous action, exhilarating the spirits, and disposing to sleep, without any narcotic action on the brain, as in periodical headache, hysteria, asthma, chorea, hectic fever, and nervous irritations attended with morbid vigilance and irregular muscular action. Dose, is five or six grains, every three or four hours, in the form of pill. Externally, it is asserted to have been advantageously employed as a styptic in wounds, and a healing application in superficial ulcers.

The small silver-headed spider, given in a dough-pill, is said to be a prompt and efficacious cure for ague.

THEA CHINENSIS.

Tea.

Nat. Ord.—Ternstroмиaceæ. *Sex. Syst.*—Monadelphia Polyandria.

THE LEAVES.

Description.—The Tea-plant is a shrub or small tree, which in a state of nature may attain a height of twenty-five or thirty feet, but which, when cultivated, seldom exceeds six or seven. The *leaves* are alternate, with short petioles, very smooth, ovate-oblong, somewhat acuminate,

stiff, coriaceous, slightly dentate, green, shining, and marked with one rib and many transverse veins. They are two or three inches long, and from half an inch to an inch broad. The *flowers* are white, axillary, and single, or supported two or three together on short, glabrous peduncles. The *calyx* is persistent, short, green, with five ovate, rounded, obtuse divisions. The *corolla* is much larger than the calyx, and consists of from four to nine large, unequal, rounded, very concave petals. The *stamens* are very numerous, rather shorter than the corolla, with subulate white filaments, bearing rounded, reniform, yellow anthers, opening at the sides. The *ovary* is ovate, downy, surrounded by a fleshy ring at base, three-celled, each cell containing two ovules. The *styles* are three, free above, with obtuse stigmas. The *fruit* is a three-celled capsule, each cell containing one, sometimes two seeds.

Several species have been named by Botanists, but at present, it is believed that only one has been described, and the others are mere varieties in which there exists a uniformity of character. There may be other species, but it is not positively determined. Either of the varieties described as *Thea Bohea* or *Thea Viridis*, will afford black or green tea according to the mode of manufacture. These varieties differ thus: *Thea Viridis*. *Leaves* ellipto-lanceolate, acuminate, emarginate, and undulate; *flowers* axillary, solitary; this variety furnishes the green tea principally. *Thea Bohea*. *Leaves* smaller and flatter, darker-green, coriaceous, terminating gradually in a point, not acuminate or emarginate; *flowers* axillary, aggregated; this affords the black tea.

History.—The Tea plant is a native of China and Japan. It is an ever-green shrub from four to eight feet high, and in favorable situations even to thirty feet. It is divided into the green and black teas. The *green tea* is characterized by a dark-green color, sometimes inclining more or less to blue or brown. It has a peculiar, refreshing, somewhat aromatic odor, and an astringent, slightly pungent, and agreeably bitterish taste. Its infusion is of a pale greenish-yellow color, with the taste and odor of the leaves. Green tea contains gallic acid, tannic acid, gum, gluten, lignin, bitter extractive, and volatile matter. *Black tea* is distinguished by a dark brown color; usually less firmly rolled and lighter than the green. Its odor is fainter, and of a somewhat different character, though still fragrant. Its taste is astringent and bitterish; less pungent and less agreeable than the green. It contains tannic acid, gum, gluten, lignin, and volatile matter.

Properties and Uses.—Gently excitant, astringent and stimulant, and the finer varieties exert a decided influence over the nervous system, evinced by the feeling of comfort, and even exhilaration which it produces, and the unnatural wakefulness to which it sometimes gives rise. In moderation, the infusion is a grateful and harmless beverage, but long continued, or in excessive quantity, it induces unpleasant, nervous

and dyspeptic symptoms. Black tea, on this account, is preferable to green. Green tea may be used in diarrhea, in debility after an emetic, cathartic, or sudorific, and as a grateful stimulant and diaphoretic in colds and some fevers. Externally, the infusion has been used with advantage as a collyrium.

Off. Prep.—Lotio Hydrastis Composita.

THUJA OCCIDENTALIS.

Arbor Vitæ.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE LEAVES.

Description.—This tree, also called *False White Cedar*, from its resemblance to the *white cedar*, (*Cupressus Thyoides*), is indigenous to this country, and attains the height of from thirty to fifty feet. The *trunk* is crooked, rapidly diminishing in size upward, throwing out recurved *branches* from base to summit; the *branches* ancipital, flat and broad. The *wood* is very light and soft, but exceedingly durable. The *leaves* are evergreen, rhomboid-ovate, with a gland on the back, squamose, appressed, imbricated in four rows. *Cones* terminal, oblong, nodding; *scales* pointless, one-seeded; *seeds* broadly winged.

History.—This evergreen tree grows wild in various parts of the United States from Canada to Carolina, on the rocky borders of streams and lakes, and in swamps, flowering in May. It abounds especially in Canada and the Northern States; it is said to attain only the height of thirty-six feet, and fourteen inches diameter when one hundred and fifty years old. The leaves and twigs are the parts used; they have an agreeable balsamic odor, and a strong, balsamic, camphorous and bitter taste. A yellowish-green volatile oil may be obtained from them by distillation. Water or alcohol extracts their virtues.

Properties and Uses.—A decoction of the leaves has been a popular remedy in intermittent fever, remittent fever, rheumatism, cough, scurvy, etc. Made into an ointment with lard or other animal fat, the fresh leaves are useful as a local application in rheumatic and neuralgic affections; a poultice of the cones and powdered Podophyllum in milk, will, it is asserted, remove the worst rheumatic pains. The oil has been successfully employed as a vermifuge. The expressed juice or tincture of the leaves is highly recommended as an application to condylomata, removing these growths in from three to four weeks. The tincture to be made by bruising an ounce of the fresh leaves, and macerating it for several days in half a pint of alcohol. The condylomata should be kept constantly moistened with the tincture by means of lint dipped in it. By some it is said to act as a powerful excitant, others again deny this.

THYMUS VULGARIS.

Thyme.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE HERB.

Description.—Thyme is a small undershrub, with erect, suffruticose, numerous, branched *stems*, procumbent at base, and from six to ten inches in height. The *leaves* are oblong-ovate and lanceolate, numerous, revolute at the sides. The *flowers* are bluish-purple, small, and in terminal, leafy, whorled spikes.

The THYMUS SERPYLLUS, Wild Thyme or *Mother of Thyme*, with a decumbent *stem*, flat, entire, elliptical, punctate, obtuse, and petiolate *leaves*, ciliate at base, and purple, spotted, capitate flowers, has similar virtues to the above.

History.—These two plants are natives of Europe, introduced into this country, and extensively cultivated in gardens as culinary plants, especially the T. Vulgaris; they blossom during the summer. The whole herb is the part used; it should be collected when in flower, and carefully dried. It has a strong, aromatic, peculiar, agreeable odor, which is retained when properly dried, and a pungent, aromatic, and camphorous taste. Its active properties depend upon a pale-yellow, or greenish volatile oil, (*oleum thymi*), of specific gravity 0.905, and which may be obtained by distillation with water. In the shops it is frequently met with of a brown color, under the name of “Oil of Origanum.” The herb yields its virtues to alcohol or boiling water by infusion.

Properties and Uses.—Thyme is tonic, carminative, emmenagogue and antispasmodic. The cold infusion is useful in dyspepsia with weak and irritable stomach, and as a stimulating tonic in convalescence from exhausting diseases. The warm infusion is beneficial in hysteria, dysmenorrhea, flatulence, colic, headache, and to promote perspiration. Occasionally, the leaves have been employed externally, in fomentation. The oil is valuable as a local application to neuralgic and rheumatic pains; and internally, to fulfill any of the indications for which the plant is used. Dose of the infusion from one to three fluidounces; of the oil, from two to ten drops on sugar, or in emulsion.

TRIFOLIUM PRATENSE.

Red Clover.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Diadelphia Decandria.

THE BLOSSOMS.

Description.—Red Clover is a biennial plant with several *stems* arising from the same root, ascending, somewhat hairy, and varying much in

its height. The *leaves* are ternate; the *leaflets* oval or obovate, entire, nearly smooth, often notched at the end, and lighter colored in the center. The *stipules* are ovate, mucronate. The *flowers* are red, fragrant, and disposed in short, dense, ovate, sessile *spikes* or *heads*. The *corollas* unequal, monopetalous; the *lower tooth of the calyx* longer than the four others, which are equal, and all shorter than the rose-red corolla.

History.—This plant is common to the United States, being extensively cultivated in grass lands, with herds-grass (*Phleum Pratense*) and other grasses, and often alone; it flowers throughout the summer. The blossoms or flowers are the parts used. A strong decoction is made of them, which is evaporated to the consistence of an extract.

Properties and Uses.—The extract spread on linen or soft leather, is said to be an excellent remedy for cancerous ulcers. It is also highly recommended in ill conditioned ulcers of every kind, and deep, ragged-edged, and otherwise badly conditioned burns. It possesses a peculiar soothing property, proves an efficacious detergent, and promotes a healthful granulation.

There are two other varieties of clover which are occasionally employed by practitioners, viz: the *Melilotus Officinalis*, of Willdenow, or *M. Vulgaris*, of Eaton,—Yellow Melilot Clover, with an erect, sulcate stem, about three feet high, with spreading branches. The *leaves* are pinnately trifoliate; *leaflets* obovate-oblong, obtuse, smooth, with remote, mucronate teeth. The *flowers* are yellow, and disposed in one-sided, spicate, axillary, loose, paniculate racemes; *calyx* half as long as the corolla; *legume* ovoid, two-seeded. It is an indigenous annual, growing in alluvial meadows, and flowering in June. The whole plant is scented, having nearly the odor of the sweet-scented vernal grass, *Anthoxanthum Odoratum*. The other is the *Melilotus Leucantha*, of Koch, *M. Alba*, of Nuttall, and *Trifolium Officinale*, of Linnæus,—White Melilot Clover, or sweet-scented clover, a biennial, with an erect, robust, very branching, sulcate stem, from four to six feet high; *leaflets* variable, oval, ovate, ovate-oblong, truncate, and mucronate at the apex, remotely serrate, and one or two inches long; *stipules* setaceous. The *flowers* are white, numerous, the racemes more loose and longer than in the preceding species. *Petals* unequal, banner longer than wings or keel; *calyx* shorter than the corolla by more than one-half. This plant grows in similar situations with the last, flowering in July and August, and having a sweet fragrance, which is improved upon being dried. The leaves and flowers of these two plants are boiled in lard, and formed into an ointment, which is found of utility as an application to all kinds of ulcers. The *Vanilla* or *Seneca Grass*, used for a stimulant purpose, is the *Hierochloa Borealis*.

TRILLIUM PENDULUM.

Bethroot.

Nat. Ord.—Trilliaceæ. Sex. Syst.—Hexandria Trigynia.

THE ROOT.

Description.—This is one of an extensive genus of North American, herbaceous, perennial plants, which are variously known under the names of *Wake-Robin*, *Birth-root*, *Indian Balm*, *Lamb's Quarter*, *Ground Lily*, etc. It has an oblong, tuberous *root*, from which arises a slender *stem*, from ten to fifteen inches in height. The *leaves* are *three* in number, whorled at the top of the stem, suborbicular-rhomboidal, abruptly acuminate, from three to five inches in diameter, and on petioles about a line in length. The *flowers* are white, solitary, terminal, cernuous, on a recurved peduncle from an inch to two and a half inches long. The *sepals* are green, oblong-lanceolate, acuminate, an inch long; the *petals* are oblong-ovate, acute, and an inch and a quarter in length by half an inch broad. *Styles* three, erect, with recurved stigmas.

History.—This plant is common to the Middle and Western States, growing in rich soils, in damp, rocky, and shady woods, and flowering in May and June. Nearly all the species of the genus *Trillium*, are medicinal, and possess analogous properties; and among them the *T. Erythrocarpum*, *T. Grandiflorum*, *T. Sessile*, *T. Erectum* and *T. Nivale*, are the most common, and consequently the most frequently collected and employed. These plants may generally be known by their three verticillate, net-veined leaves, and their solitary, terminal flower, which varies in color in the different species, being white, red, purple, whitish-yellow, or reddish-white; the peduncle will also be found erect in some species, and recurved in others. The roots of these plants are oblong or terete, somewhat tuberous, dark or brownish externally, white internally, from one to five inches in length, and from half an inch to an inch and a half in diameter, beset with a few branching fibers laterally. They have a faint, slightly terebinthinate odor, and a peculiar aromatic and sweetish taste; when chewed they impart an acrid astringent impression in the mouth, causing a flow of saliva, and a sensation of heat in the throat and fauces. The root is said to contain volatile oil, gum, resin, extractive, tannic acid, and fecula. It yields its active properties to water, and its tonic and stimulant virtues to diluted alcohol.

Properties and Uses.—Bethroot is astringent, tonic, and antiseptic; it has been employed successfully in hemoptysis, hematuria, menorrhagia, uterine hemorrhage, leucorrhea, cough, asthma, and difficult breathing, and is said to have been much used by the Indian women to promote parturition. The most astringent are used in hemorrhages; the most acrid in asthma, hectic fever, and catarrhal cough; and all are serviceable in leucorrhea, and morbid discharges from mucous tissues. Boiled

in milk, it has been administered with benefit in diarrhea and dysentery; and an infusion of equal parts of *Trillium* and *Lycopus Virginicus*, has been highly recommended for the cure of diabetes. Externally, the root made into a poultice, is very useful in tumors, indolent or offensive ulcers, carbuncles, bubos, stings of insects, and to restrain gangrene. In some instances its efficacy has been increased by combination with bloodroot. Mr. W. S. Merrell states that the red bethroots will check ordinary epistaxis, by merely smelling the freshly exposed surface of the recent root, and he supposes therefore that they contain an astringent principle of a volatile nature. The leaves of the beth-plants, boiled in lard have been much used, in some sections of country, as an application to ulcers, tumors, etc. Dose of powdered bethroot one drachm, to be given in hot water; of the strong infusion, which is the most common form of administration, from two to four fluidounces. These plants undoubtedly possess active properties, and deserve further investigation.

TRIOSTEUM PERFOLIATUM.

Fever-root.

Nat. Ord.—Caprifoliaceæ. *Sex. Syst.*—Pentandria Monogynia.

BARK OF THE ROOT.

Description.—This plant is known also by the names of *Wild Ipecac*, *Horse-Gentian*, *Wild Coffee*, and *Dr. Tinker's Weed*. It is indigenous, with a perennial, thick and fleshy root, subdivided into numerous horizontal branches. The stems are several from the same root, simple, stout, erect, round, hollow, soft, pubescent, and from two to four feet high. The leaves are opposite, oval-acuminate, mostly connate, entire, abruptly contracted at base, nearly smooth above, pubescent beneath, prominently veined, and six inches long by three broad; in some plants the upper leaves are almost amplexicaul. The flowers are of a dull purple color, axillary, sessile, mostly in clusters of three or five in the form of whorls, rarely solitary. The calyx is composed of five linear segments of a purplish color, with a single bract; the corolla is rather longer than the calyx, tubular, five-lobed, viscid-pubescent, the lobes rounded, and the lower part of the tube gibbous. The stamens are five, included, with hairy filaments. The ovary is inferior, roundish, and supports a long, slender style, with an oblong stigma. The fruit is an oval berry, about nine lines long and six thick, of an orange-red or purple color when ripe, hairy, somewhat three-sided, crowned with the persistent calyx, three-celled, each cell containing a hard, bony, furrowed seed.

History.—Fever-root is found in many parts of the United States, in shady and rocky situations, and in rich soil, flowering in June and July. The bark of the root is the officinal part; it is horizontal, long, from

half an inch to three-quarters of an inch in diameter, of a brownish or yellowish color externally, whitish within, and furnished with fibers. It has a nauseous odor, and an unpleasant, bitter taste, and when dried is brittle, and easily pulverized. Water or alcohol takes up its virtues. It has not been analyzed. The *Triosteum Angustifolium*, smaller than the above, with a bristly, hairy stem, lanceolate, and sub-connate leaves, tapering to the base, peduncles opposite, one-flowered, and flowers of a greenish-cream color, possesses analogous properties, and may be substituted as an equivalent for the above.

Properties and Uses.—The bark of the root is emetic when recent, or when taken in large doses of the powder. In doses of from a scruple to a drachm, the powder is a mild, but slow cathartic, with a tonic influence. In the early stages of fever, it may be given in all cases where a gentle action on the bowels is desired. It has been recommended as a laxative- tonic in dyspepsia, and autumnal fevers, also in hysteria, hypochondria, and convalescence after febrile diseases. Some have stated it to possess diuretic properties, and have employed it in chronic rheumatism with success. Rafinesque considers the leaves to be diaphoretic. The hard seeds are said to be a very excellent substitute for coffee, when properly prepared. Dose of the tincture from one to four fluidrachms; of the extract, which is the best form of administration, from five to fifteen grains.

TRITICUM HYBERNUM.

Wheat.

Nat. Ord.—Graminaceæ. *Sex. Syst.*—Triandria Digynia.

FLOUR OF THE SEEDS.

Description.—This plant, the common Winter Wheat, described as *T. Sativum*, and *T. Vulgare*, has a fibrous root, and one or more erect, round, smooth, jointed stems, from three to five feet in height, with the internodes somewhat inflated. The leaves are linear, pointed, entire, flat, many-ribbed, rough, somewhat glaucous, with truncate, jagged-bearded stipules. The flowers are in a solitary, terminal, dense, smooth, imbricated, somewhat four-sided spike, two or three inches long, with a tough rachis. Spikelets crowded, broad-ovate, about four-flowered; glumes ventricose, ovate, truncate, mucronate, compressed below the apex, round and convex at the back, with a prominent nervure. Paleas of the upper florets somewhat bearded. Grains loose.

History.—Several species of *Triticum* are cultivated in different countries, among which may be named the *T. Vulgare*, the species most generally raised in this country and Europe. It has two varieties, *T. Vulgare Æstivum* or Spring-Wheat, and *T. Vulgare Hybernium*, or Winter-Wheat. Linnæus considered these as distinct species, but Botanists

of the present day generally refer them to one common stock. Wheat differs from barley and oats, in not having the perianth adherent to the grain. Its native country is unknown, but is commonly supposed to have been Central Asia. The officinal part of the plant is the flour of the seeds; these are first deprived of their husks, and are then reduced to flour by grinding and sifting; the interior farinaceous part forming the *farina* or *flour*, which varies in its degree of fineness, while the covering or external coat, which constitutes from 25 to 33 per cent. of the seeds, furnishes what is called *bran*.

Wheat flour is very white, of a faint, peculiar odor, and nearly tasteless. It consists chiefly of starch, gluten, albumen, saccharine matter, gum, a little ligneous fiber, and some moisture, which vary considerably in their proportions, in different samples. The *starch* is the most abundant ingredient, and is of finer quality and of greater density than that obtained from most other sources. (*See Amylum.*) The *gluten* of wheat is generally assumed as the most perfect form of that principle, and is more abundant in wheat than any other grain; and it is to the greater proportion of this principle, that wheat flour owes its superiority over that from other grains for the preparation of bread. When wheat flour, inclosed in a linen bag, is exposed to the action of a stream of water, and at the same time pressed with the fingers till the liquor comes away colorless, the portion which is left in the bag consists of gluten and vegetable albumen, which may be separated by boiling in alcohol. The gluten being dissolved by the alcohol, and the vegetable albumen not being affected by it. Each of these substances contain nitrogen, and when left to themselves in a moist state, undergo putrefaction. By placing the alcoholic solution of gluten, previously filtered while hot, into water, and distilling off the alcohol, the gluten will float on the top of the water in large cohering flakes. It may be still further purified by treating it with ether, to remove fat oil.

Pure *gluten*, at present called *Vegetable Fibrin*, is a pale-yellow, adhesive, elastic substance, becoming darker-colored and translucent when dried, somewhat like horn. It is insoluble in water, ether, and in the fixed and volatile oils. Boiling alcohol dissolves it more readily than cold. It forms soluble compounds with diluted acids or alkaline solutions; and nearly insoluble compounds with the earths and metallic oxides, which are precipitated when the earths or oxides are added to the solution of gluten in liquid potassa. Its acid or alkaline solutions are precipitated by corrosive sublimate, which, on being added in solution to moist gluten, forms a compound, which, when dry, is hard, opake and incorruptible. Infusion of galls also precipitates gluten. This principle exists in most of the farinaceous grains, and in the seeds of some leguminous plants.

Vegetable Albumen possesses no adhesiveness, and, when dried, is opake, and of a white, gray, or brown color. It exists in a soluble

form in vegetables, and especially in the oily seeds, along with caseine. Before coagulation it is soluble in water, but insoluble in alcohol. When heated to from 140° to 160° , it coagulates, and becomes insoluble in water. Its solutions are also coagulated by acids, infusion of galls, creosote, and corrosive sublimate. It is dissolved by solutions of the caustic alkalies. When a fresh vegetable juice is filtered and boiled, it yields a coagulum, which is nearly pure albumen. It is a constituent of all the seeds which form a milky emulsion with water, and in most of them is associated with gluten.

It is to vegetable fibrin and albumen, aided by a moderate heat and the presence of water, that starch is converted partly into gum and partly into sugar, as in the germination of seeds; the gluten becoming acid in the process, loses its power of reacting on the starch.

As far as ascertained, *vegetable albumen* is identical with *animal albumen*, and the *gluten of vegetables* with *animal fibrin*; and these, with *casein*, a principle existing in both the animal and vegetable kingdoms, consist of *protein* in combination with a small proportion of mineral substances, as sulphur and phosphorus. Protein is compounded of nitrogen, carbon, hydrogen and oxygen, its formula being $N_6 C_{48} H_{36} O_{14}$. It may be obtained by dissolving any of the above-named substances in a strong solution of potassa, heating for some time to 120° , and precipitating with acetic acid.

Bread is formed by making a thick paste with wheat flour and water, adding a little salt, and some yeast, setting it aside to ferment, and then baking it. The carbonic acid gas which is extricated during the fermentation, is retained by the tenacity of the gluten, forming numerous small cells through the mass, and thus renders the bread light.

Properties and Uses.—Wheat flour in its unaltered state is seldom used in medicine. It is sometimes sprinkled on the skin in erysipelatous inflammation, and various itching or burning eruptions, particularly the nettle-rash; though rye-flour is generally preferred for this purpose. In the state of bread it is much more employed. An infusion of toasted bread in water is a pleasant, somewhat nutritive drink, very well adapted to febrile complaints. Within our experience, no drink has been found more grateful in such cases than this infusion sweetened with a little molasses, and flavored by lemon-juice. Boiled with milk, bread constitutes the common suppurative poultice, which may be improved by the addition of a small proportion of perfectly fresh lard. Slices of it steeped in borax water, or the crumb mixed with the fluid and confined within a piece of gauze, afford a convenient mode of applying this preparation to local inflammations. The crumb—*mica panis*—is, moreover, frequently used to give bulk to minute doses of very active medicines administered in the form of pill. As bread contains salt, its incompatibilities, as for instance, nitrate of silver, should be remembered, when forming pills with it.

Bran is sometimes used in decoction, as a demulcent in catarrhal affections and complaints of the bowels. It has, when taken in substance,

laxative properties, and is used by some persons habitually and with great advantage to prevent costiveness. Bran bread, made from the unsifted flour, forms an excellent laxative article of diet in some dyspeptic cases. The action of the bran is probably altogether mechanical, consisting in the irritation produced upon the mucous membrane of the stomach and bowels by its coarse particles.

We are indebted to Dr. T. J. Wright, of Cincinnati, for the following remarks on wheat, the correctness of which has been corroborated by other physicians who have made use of it according to his method. His mode of preparing and using it is as follows:

“The seeds of wheat should be well cleaned before cooking them, in the following manner: Take of the seeds of wheat a sufficient quantity, and place them in clear, cold water, stir it, and skim off the light grains which rise to the surface in connection with foreign substances; then change the water, stir the grain, and skim as before, and thus continue till the wheat is perfectly clean, and all the light grains and extraneous substances are removed. To the wheat, thus cleansed, add a sufficient quantity of water to cover it, and allow it to stand for twelve hours, or until the next morning, if this is done at night; then pour off the liquid, and add of some clean water a sufficient quantity, and boil for from two to four hours, or until the spermoderm is cracked, when remove the wheat from the water, let it cool, and it is ready for use. Of this prepared wheat, small quantities ought to be made at a time, especially in warm weather, as it is apt to become sour; enough for one or two days at the most, is sufficient, and it should always be kept in a cool place.

“There are several ways in which this preparation can be used, viz: It may be eaten with molasses or sugar, as boiled rice is sometimes eaten; or it may be made into a frumenty, by boiling a sufficient quantity of milk, and thickening it with flour to the consistence of gruel; remove from the fire, add as much prepared wheat as desired, and sweeten. But the preparation which I prefer, is to use water instead of milk, and thicken with Indian meal to the consistence of gruel, then remove from the fire, add prepared wheat in quantity to suit the patient and sweeten. Wheat thus prepared, undoubtedly acts mechanically, owing to the action of the coarse particles upon the intestinal mucous lining membrane, which maintain the peristaltic motion and keep the bowels in a soluble condition; and in addition to its nutritive qualities, prepared wheat is one of the most valuable articles of diet for patients, and may be used either in a loose or torpid state of the bowels. In dyspepsia, fistula in ano, hemorrhoids, constipation, as well as the opposite condition, the employment of it is not only beneficial, but materially assists in their cure. I have extensively used the above in obstinate constipation, chronic diarrhea, and other diseases, with decided advantage in every case, and can, therefore, confidently recommend it to my medical brethren.”

TUSSILAGO FARFARA.

Coltsfoot.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE LEAVES.

Description.—Coltsfoot has a long, perennial root, with the leaves radical, cordate, on downy, furrowed petioles somewhat lobed and toothed, smooth and dark-green above, white, veined, and tomentose beneath, and from five to eight inches long, by three to six wide; when young, the leaves are revolute, and covered with a cottony down; they arise after the flowers have withered. The *scapes* are several, and appear before the leaves; they are erect, slender, round, varying in color from pale-green to reddish-brown, one-flowered, and beset with numerous lanceolate scales; their height is from five to six inches. The *flowers* are large, yellow, compound; the *florets of the ray* being ligulate, numerous, and fertile, while those of the disk are few, tubular, and barren. The *scales of the involucre* are linear-lanceolate, equal to the disk, at first erect, but finally reflexed. The *achenia* are smooth, oblong, and compressed; the *pappus* is pilose, sessile, silvery, and permanent.

History.—This plant is very common in Europe, and has become naturalized in this country, especially in the Northern States; it flowers in April. The root is mucilaginous, bitterish, creeping horizontally, with many fibers. It grows in wet places and low meadows. The flowers have an agreeable odor, which they retain when dried. The whole plant is medicinal, but the leaves are principally employed. They should be gathered after their full expansion, but before they have attained their greatest magnitude. The dried leaves and root are inodorous, and have a rough, bitter, mucilaginous taste, and impart their properties to boiling water. No analysis has been made of them.

Properties and Uses.—Coltsfoot is emollient, demulcent, and slightly tonic. Useful in coughs, asthma, hooping-cough, and other pulmonary affections; and is said to have been useful in scrofula. The powdered leaves form a good errhine, for giddiness, headache, nasal obstructions, etc. Used externally in form of poultice to scrofulous tumors.

TYPHA LATIFOLIA.

Cat-tail Flag.

Nat. Ord.—Typhaceæ. *Sex. Syst.*—Monœcia Triandria.

THE ROOT.

Description.—Cat-tail Flag, or *Reed Mace*, as it is sometimes called, is a perennial plant, with a smooth, round stem, from three to five feet high, leafy below, and terminated by large cylindric spikes. The leaves are flat, erect, ensiform, slightly concave within near the base, from two

to four feet long, and nearly one inch wide. The *flowers* are very numerous. The *spikes* are of a brownish color, from six to ten inches in length, and about one inch in diameter, and are composed of slender, downy flowers, so compact, particularly the fertile ones, as to be of considerable hardness. The upper portion is smaller, and composed of the sterile flowers, so that the staminate and pistillate parts of the spike approximate, or are almost continuous.

History.—This plant is common to all parts of the United States, and is found growing in ditches, muddy pools, borders of ponds, and other wet places, flowering in July. The leaves are called *Flags*, and are used for weaving the seats of chairs; the flowers have been used for making beds. The root is the part used; it yields its properties to water.

Properties and Uses.—Astringent and emollient. Boiled with milk, it has been found useful in dysentery, diarrhea, and infantile summer complaint, and a decoction of it has been beneficial in gonorrhea. Externally, the root, in combination with elm and aromatics, forms an excellent poultice for white swellings, tumors, and ulcers. The root, bruised until it becomes like a jelly, forms an excellent application for burns and scalds, erysipelas, ophthalmia, and all local inflammations.

ULMUS FULVA.

Slippery Elm.

Nat. Ord.—Ulmaceæ. *Sex. Syst.*—Pentandria Digynia.

THE INNER BARK.

Description.—Slippery Elm, also called *Red Elm*, is a tree from twenty to sixty feet in height, and one or two feet in diameter. The bark of the trunk is brown, that of the branches rough and whitish. The *leaves* are oblong-ovate, acuminate, nearly equal at the base, unequally serrate, pubescent and very rough on both sides, four or five inches long by two or three in breadth, and supported on short footstalks. The *buds* are covered with fulvous down. The *flowers* appear before the leaves, are reddish, sessile, and in clusters at the ends of the young shoots; the bunches of flowers are surrounded by scales, which are downy like the buds. The *calyx* is downy and sessile; *corolla* none; *stamens* five or seven, according to the number of calyx lobes, short, and of a pale rose color. The *fruit* is a membranaceous capsule or samara, nearly orbicular, containing in the center one round seed, without any fringe.

History.—The Slippery Elm is a lofty tree indigenous to all parts of the United States, but found in the greatest abundance west of the Alleghany mountains, in open and elevated situations, in rich, firm soil, and flowering in April. The inner bark is the part used in medicine; it is in long, flat pieces, from one to two lines in thickness, of a fibrous texture, a tawny color, which is reddish on the inner surface, a peculiar

sweetish, not unpleasant odor, and a highly mucilaginous taste when chewed. By grinding, it is reduced to a light, grayish-fawn-colored powder. Water takes up its mucilage, which is precipitated by solutions of acetate and subacetate of lead, but not by alcohol.

Properties and Uses.—Elm bark is nutritive, expectorant, diuretic, demulcent, and emollient, and is a very valuable remedial agent. In mucous inflammations of the lungs, bowels, stomach, bladder or kidneys, used freely in the form of a mucilaginous drink, it is highly beneficial, as well as in diarrhea, dysentery, coughs, pleurisy, strangury, and sore throat, in all of which it tends powerfully to allay the inflammation. A tablespoonful of the powder boiled in a pint of new milk affords a nourishing diet for infants weaned from the breast, preventing the bowel complaints to which they are subject, and rendering them fat and healthy. Some physicians consider the constant use of it, during and after the seventh month of gestation, as advantageous in facilitating and causing an easy delivery; a half pint of the infusion to be drunk daily. Elm bark has likewise been successfully employed externally in cutaneous diseases, especially in obstinate cases of herpetic and syphilitic eruptions, and certainly possesses higher curative powers than are generally admitted. As an emollient poultice, the bark has been found very serviceable as an application to inflamed parts, suppurating tumors, fresh wounds, burns, scalds, bruises, and ulcers; and in the excruciating pains of the testes which accompany the metastasis of cynanche parotidæa, whether of recent or long standing, the constant use of an elm poultice regularly changed every four hours will be found a superior remedy. As an injection, the infusion will prove useful in diarrhea, dysentery, tenesmus, and hemorrhoids, also in gonorrhea and gleet. The powder, sprinkled on the surface of the body, will prevent and heal excoriations and chafings, and allay the itching and heat of erysipelas. As the bark increases in bulk by imbibing moisture, it has been recommended to form bougies and tents of it for the dilatation of strictures, fistulas, etc., but in urethral strictures it has proved troublesome, from liability of the part behind the stricture, breaking off in the attempt to withdraw it, and passing into the bladder. The infusion of the bark is the common form of administration, and may be drunk *ad libitum*.

Off. Prep.—Cataplasma Ulmi; Infusum Ulmi.

URTICA DIOICA.

Common Nettle.

Nat. Ord.—Urticaceæ. *Sex. Syst.*—Monœcia Tetrandria.

THE ROOT AND LEAVES.

Description.—This plant, also called *great Stinging Nettle*, is a perennial, herbaceous, dull-green plant, armed with minute rigid hairs or

prickles, which transmit a venomous fluid when pressed. The *stem* is obtusely four-angled, branching, and from two to four feet high, and arises from a creeping and branching *root*, with fleshy shoots and many fibers. The leaves are opposite, petiolate, cordate, lance-ovate, spreading, conspicuously acuminate, coarsely and acutely serrate, the point entire, armed with stings, three or four inches long, and about half as wide. The *flowers* are small, green, monœcious or diœcious, in branching, clustered, axillary, interrupted *spikes*, longer than the petioles.

History.—This is a well known plant, common to Europe and the United States, growing in waste places, by wood-sides, in hedges, and in gardens, flowering from June to September. A decoction of the plant strongly salted, will coagulate milk as readily as rennet, without imparting to it any unpleasant flavor. The leaves and root are generally used, and yield their virtues to water. No analysis has been made of the plant. The young shoots have been boiled and eaten as a remedy for scurvy. The irritation caused by applying the sharp hairs of the nettle to the skin, is said to be owing to the presence of free formic acid in them.

Properties and Uses.—Common Nettle is astringent, tonic, and diuretic. A decoction is valuable in diarrhea, dysentery, hemorrhoids, various hemorrhages, and scorbutic affections, and has been recommended in febrile affections, gravel, and other nephritic complaints. A strong syrup made of the root, combined with suitable quantities of wild cherry bark and blackberry root, forms an excellent remedy for all summer complaints of children, and bowel affections of adults. The leaves of the fresh plant, stimulate, inflame, and even raise blisters on those portions of the skin with which they come in contact, and have, in consequence, been used as a powerful rubefacient. Paralysis is said to have been cured by whipping the affected limbs with them. Applied to bleeding surfaces they are an excellent styptic. The seeds and flowers, given in wine, in doses not to exceed one drachm, have been reputed equal to cinchona in tertian and quartan agues—larger doses will, it is said, induce a lethargic sleep. The seeds, in doses of fourteen or sixteen seeds, and repeated three times daily, are highly recommended as a remedy for goitre, and to reduce excessive corpulence; they are also considered anthelmintic. Dose of the powdered root or leaves from twenty to forty grains; of the decoction from two to four fluidounces.

Urtica Urens, or Dwarf Nettle, possesses similar properties, and has been found very efficacious in uterine hemorrhage. It has a branching, hispid, stinging *stem*, one or two feet high, with broadly elliptic, acutely serrate *leaves*, about five-veined, on short petioles, one or two inches long, and about two-thirds as broad. The *flowers* are in drooping, pedunculate, nearly simple clusters, two in each axil, and shorter than the petioles. This is an annual, introduced from Europe.

Urtica Pumila, Cool-weed, Rich-weed, or Stingless Nettle, has a peculiar, grateful, strong smell, indicating active properties; it is stated that the leaves bruised give immediate relief in inflammations, painful swellings, ecchymosis, erysipelas, and the topical poison of rhus; and that an ointment made from it is beneficial in inflammatory rheumatism. It is the *Pilea Pumila* of Lindley, and has a smooth, shining, ascending, weak and succulent, often branched, and translucent stem, from four to eighteen inches high, and, together with the whole plant, destitute of stings. The leaves are on long petioles, opposite, rhombic-ovate, crenate-serrate, membranaceous, glabrous, pointed, three-nerved, about two inches long, and two-thirds as broad. The flowers are moncecious, triandrous, in axillary, corymbed heads shorter than the petioles. Sepals of the fertile flowers lanceolate, and a little unequal. This plant is worthy of further investigation.

UVARIA TRILOBA.

Papaw.

Nat. Ord.—Anonaceæ. Sex. Syst.—Polyandria Polygynia.

THE SEEDS.

Description.—This is the *Porcelia Triloba* of Michaux, and the *Asimina Triloba* of Adamson, it is a small and beautiful indigenous tree, growing from ten to twenty feet high. The young shoots and expanding leaves clothed with a rusty down, soon glabrous. The leaves are thin, smooth, entire, ovate-oblong, acuminate, from eight to twelve inches long, by three or four broad, and tapering to very short petioles. The flowers are dull purple, axillary and solitary; the petals veiny, round-ovate, the outer ones orbicular and three or four times as large as the calyx. The flowers appear with the leaves, and are about an inch and a half wide. The fruit is a yellowish, ovoid-oblong, pulpy pod, two or three inches long by about an inch in diameter, fragrant, sweet and edible in autumn, and containing about eight seeds.

History.—The Papaw or Custard Apple-tree is an inhabitant of the Middle, Southern, and Western States, growing in rich soil, and on the banks of streams, and flowering from March to June. The fruit is large and fleshy, and has an unpleasant smell, but when ripe and after frost, the pulp is sweet, luscious, and yellow, similar to custard; it is considered a healthy fruit, and is sedative and laxative. The seeds, which are the parts used, have a fetid smell, similar to stramonium; they are covered with a tough, hard, exterior coat, of a light-brownish color and smooth externally, lighter and wrinkled internally, inclosing a kernel of a whitish-yellow color, compressed, deeply fissured on both sides, nearly inodorous, very faintly bitter and sweetish, and dry and branny when chewed, leaving a very persistent, faint, but rather unpleasant sensation

of nausea. They are of various shapes, being flat, ovoid, nearly circular, or somewhat reniform, with a longitudinal furrow or depression along the center of each of the flat surfaces, and frequently a ridge or elevation instead of the furrow. They yield their properties to alcohol.

Properties and Uses.—Emetic; for which purpose a saturated tincture of the bruised seeds is employed, in doses of from ten to sixty drops. The bark is said to be a bitter tonic, and has been used as such in domestic practice. The medical properties of this agent have not been fully investigated.

UVULARIA PERFOLIATA.

Bellwort.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE ROOT.

Description.—Bellwort has a perennial, creeping rootstock, and a *stem* from eight to fourteen inches high, dividing at top into two branches. The *leaves* are clasping-perfoliate, elliptical, rounded at base, acute at apex, two or three inches long by one-third as broad, smooth, glaucous underneath. The *flowers* are solitary, pale-yellow, about an inch long, and pendulous from the end of one of the branches; *perianth* subcampanulate, tuberculate-scabrous within; *segments* linear-lanceolate, about an inch long, twisted; *anthers* cuspidate, three-fourths of an inch long. *Capsule* or *pod* obovate-truncate, divergently three-lobed at top; lobes with convex sides.

History.—Bellwort is a smooth, handsome plant common to the United States, growing in moist copses, woods, etc., and flowering in May. The root is the part employed, which, when recent, is acrid and mucilaginous. It imparts its properties to water.

Properties and Uses.—Bellwort is tonic, demulcent, and nervine, and may be used in decoction or powder, as a substitute for cypripedium. The decoction has proved beneficial in sore mouth and affections of the throat, also inflammation of the gums. A poultice of it is useful in wounds and ulcers. Boiled in milk, and the decoction drank freely, with a poultice of the root applied to the wound, it has considerable reputation as an alexipharmic in the bites of venomous snakes. A poultice of the green or dried root, in powder, and mixed with hot new milk, is very highly recommended in all stages of erysipelatous inflammation, to be renewed when dry; the same application has been used beneficially in acute ophthalmia. An ointment made by simmering the powdered roots and green tops in lard, for an hour, over a slow fire, and straining by pressure, is useful in herpetic affections, sore ears, mouths, etc., of children, and also in mild cases of erysipelas.

VACCINIUM FRONDOSUM.

Blue Whortleberry.

Nat. Ord. — Ericaceæ. Sex. Syst. — Decandria Monogynia.

THE FRUIT.

Description.—This is a shrub from three to six feet high, with a grayish bark, and round, smooth, slender and divergent branches. The leaves are deciduous, obovate-oblong, obtuse, entire, pale, glaucous beneath, and covered with minute resinous dots, the margin being slightly revolute. The flowers are small, nearly globose, reddish-white, and arranged in loose, slender, lateral, bracteate racemes; bracts oblong or linear, rather deciduous, shorter than the pedicels; pedicels from five to ten lines long, slender, drooping, bracteate near the middle. Corolla ovoid-campanulate, with acute divisions, and inclosing the stamens. Fruit large, globose, dark-blue, covered with a glaucous bloom, sweet and edible.

VACCINIUM RESINOSUM, *Black Whortleberry* or *Huckleberry*, is a bushy shrub from one to three feet in height. The branches are cinerous-brown, and villose when young. The leaves are deciduous, oblong-ovate, or oblong-lanceolate, rather obtuse, entire, petiolate, one or two inches long, and about one-third as wide, thickly covered with shining resinous dots beneath. The flowers are reddish, tinged with green, or yellowish-purple, and disposed in lateral, secund, dense, corymbose racemes, small and drooping; pedicels about the length of the flowers, sub-bracteolate; bracts and bractlets reddish, small, and deciduous. The corolla is ovoid-conic, at length subcampanulate, five-angled, contracted at the mouth, and longer than the stamens, but shorter than the style. Fruit globose, black, without bloom, sweet and edible.

History.—These plants are common to the Northern States, growing in woods and pastures, flowering in May and June, and ripening their fruit in August. The fruit, or berries, together with the bark of the root are the parts used. They yield their virtues to water.

The different varieties of Whortleberry possess similar properties, as the *V. Dumosum*, or Bush-Whortleberry, *V. Corymbosum*, or Giant-Whortleberry, *V. Pennsylvanicum*, or Black-blue-Whortleberry, *V. Vitis Idæa*, or Bilberry, and several others. Several species are found growing in the mountainous regions of some of the Southern States. Torrey and Gray have removed the *V. Frondosum*, *V. Resinosum*, and *V. Dumosum*, from the genus *Vaccinium*, and placed them in a new one called *Gaylussacia*, in honor of the distinguished chemist, Gay-Lussac.

Properties and Uses.—Diuretic and astringent. The fruit is very useful, eaten alone, with milk or sugar, in scurvy, dysentery, and derangements of the urinary organs. The berries and root, bruised and steeped in gin, form an excellent diuretic, which has proved of much

benefit in dropsy and gravel. A decoction of the leaves or bark of the root is astringent, and may be used in diarrhea, or as a local application to ulcers, leucorrhea, and ulcerations of the mouth and throat. Both the berries and root-bark of *V. Arboreum*, or farkleberry, are very astringent, more so than the other varieties above-named, and may be used in all cases where this class of agents is indicated.

VALERIANA OFFICINALIS.

Valerian.

Nat. Ord.—Valerianaceæ. *Sex. Syst.*—Triandria Monogynia.

THE ROOT.

Description.—The officinal Valerian, sometimes known as *Great Wild Valerian*, is a large, handsome, herbaceous plant, with a perennial, short, tuberculated *rhizome*, from which issue many long, slender fibers of a dusky-brown color, and having a fetid smell. The *stem* is erect, hollow, smooth, furrowed, and about three or four feet high. The *leaves* are of a deep glossy-green, serrated, somewhat hairy beneath, opposite, pinnate, but differing in the number of leaflets. The lower leaves are generally furnished with ten pairs, those of the stem with nine, and the upper ones with from five to seven; the leaves of the stem are attached by short broad sheaths, the radical ones are larger, and have long petioles. The *leaflets* of the stem are lanceolate and partially dentate, those of the radical leaves are elliptical and deeply serrate. The *flowers* are small, of a reddish-white color, fragrant, and disposed in dense corymb-like panicles, terminal and perfect. *Bracts* ovate-lanceolate, acuminate, herbaceous, membranous at the edge, appressed, rather longer than the ovary. The *calyx* is superior, rolled inward in the form of a rounded thickened rim, finally expanding into a kind of pappus to the seed. The *corolla* is funnel-shaped and smooth; the *tube* gibbous at the base on that side of the flower turned away from the axis, hairy internally; *limb* spreading, divided into five nearly equal, concave, linear, rounded segments. The *stamens* are three, exserted, subulate, white, from the middle of the corolla-tube, with oblong yellow *anthers*. The *ovary* is inferior, narrow-oblong, compressed, one-celled, with a single pendulous ovule; *style* filiform; *stigma* divided into three filiform lobes. *Fruit* light-brown, linear-ovate, compressed, with a slightly elevated ridge on one side, terminated by the twelve filiform, plumose, recurved segments of the calyx-limb.

History.—Valerian is a European plant growing in damp woods and meadows, and sometimes in dry banks; those found in dry elevated situations, present botanical differences of a marked character, and are considered superior to the others in medicinal virtue. The plant flowers in June and July. There are several varieties growing in this country.

The root is the officinal portion, and consists of long, slender, cylindrical fibers, about four inches in length, and half a line in thickness, issuing from a tuberculated head or rhizoma. It should be collected in spring before the stem begins to shoot, or in the autumn when the leaves decay, and should be dried quickly and kept in a dry place. Externally, its color is yellowish or brown, and internally white, and when dried it possesses a strong, peculiar odor, very disagreeable to many persons, and a taste at first sweetish, afterward bitter and aromatic; its powder is yellowish-gray. It imparts its properties readily to water, rectified spirit, or ammoniated spirit. The best valerian is obtained from England. Valerian contains volatile oil, a peculiar extractive matter, soluble in water, insoluble in ether or alcohol, and precipitated by metallic solutions, gum, soft odorous resin, and lignin. Among these the most important is the essential oil, in which the virtues of the root chiefly reside; it is of a pale-greenish color, becoming yellow and viscid by exposure, of specific gravity 0.934, with a powerful, penetrating valerian odor, and a warm aromatic taste. It may be obtained by distillation of the root with water. An acid, termed *Valerianic acid*, is obtained by oxidation of the volatile oil; it is a colorless liquid, oleaginous in consistence, having a valerian odor, a very strong, sour, disagreeable taste, and forming salts with salifiable bases. This acid can likewise be obtained by the action of caustic potassa on the oil of potato spirit. *Valerianic acid* may also be prepared by distilling 100 parts of valerian root with 500 of water, 10 of sulphuric acid, and 6 of bichromate of potassa; or, boil valerian root for three hours in rather more than its bulk of water, in which an ounce of carbonate of soda is dissolved for every pound of the root, replacing the water as it evaporates. Express strongly, and boil the residuum twice with the same quantity of water, expressing each time as before. Mix the liquids, add two fluidrachms of strong sulphuric acid for every pound of the root, and distil till three-fourths of the liquid have passed over. Neutralize this with carbonate of soda, concentrate the liquid, decompose the valerianate of soda contained in it by sulphuric acid, and separate the valerianic acid now set free, either by a separatory or by distillation. Gruneberg recommends the following: Take $2\frac{3}{4}$ lbs of bichromate of potassa, introduce it into a retort, and pour $4\frac{1}{2}$ lbs of hot water upon it. A cooled mixture of 1 lb of fusel oil and 4 lbs of sulphuric acid diluted with 2 lbs of water is to be allowed to flow very slowly and in a thin stream into the liquid in the retort, and the whole is then to be distilled. The distillation goes on quietly, and 9 ounces of oily valerianic acid are obtained.

Properties and Uses.—Valerian is tonic, antispasmodic, and calmative. In large doses it produces a sense of heaviness and dull pain in the head, with other effects indicating nervous disturbance. It is useful in cases of irregular nervous action, as in the restlessness and irritability occur-

ring in hysterical constitutions, in the morbid vigilance of fevers, in hypochondriasis, epilepsy, hemicrania, and occasionally in intermittent and remittent fevers. It may be used in powder or infusion, the latter being less liable to irritate the alimentary canal; the tincture is also officinal. The extract or decoction should not be employed, as the virtue of the root resides in a volatile oil. Dose of the powder from thirty to ninety grains, three or four times a day; of the infusion from one to two fluidounces; of the tincture from half a fluidrachm to two fluidrachms; of the oil from four to six drops.

Off. Prep.—Acidum Valerianicum; Extractum Valerianæ Fluidum; Infusum Valerianæ; Oleum Valerianæ; Pilulæ Valerianæ Compositæ; Tinctura Valerianæ; Tinctura Valerianæ Ammoniata.

VANILLA AROMATICA.

Vanilla.

Nat. Ord.—Vanillaceæ. *Sex. Syst.*—Gynandria Monandria.

THE FRUIT OR PODS.

Description.—Vanilla Aromatica is a shrubby, climbing, aerial parasite, it commences its growth in the crevices of rocks, or on the trunks of trees, suspending itself to contiguous objects, and finally becomes detached from its original support, being truly an aerial plant. Planted in the woods or in warm ravines, it grows rapidly, fastening upon the trees in its neighborhood, especially those whose barks are soft and spongy. The *stem* is round, about as thick as the finger, from twenty to thirty feet in length, and often smaller at the base than at the summit. The *leaves* are alternate, oblong, entire, on short petioles, glaucous, green, fleshy, and pointed by a species of abortive tendril, which is a continuation of the midrib; opposed to each leaf are one or two aerial roots, which attach themselves to surrounding objects. The *flowers* are axillary, paniculate, yellowish-white at base, and attended with one green bract; they expand one after another and endure only for a day. The *ovaries* appear at first view to be peduncles, they are erect after fecundation, and then become pendulous as they enlarge. The *fruit* is a silique or species of bean, yellow or buff color, of an agreeable aromatic odor, and filled with a pulpy matter containing acicular crystals of an impure benzoic acid. They must be dried with care or they lose their properties.

History.—Vanilla grows in the West Indies, Mexico, and South America. The pods are collected before they are quite ripe, dried in the shade, covered over with a coat of fixed oil, and then tied in bundles, which are surrounded with sheet-lead, or inclosed in small metallic boxes, and sent into the market. There are several varieties of vanilla in commerce, the most valuable consisting of cylindrical, somewhat

flattened pods, six or eight inches long, three or four lines thick, nearly straight, narrowing toward the extremities, bent at the base, shining, and dark-brown externally, wrinkled longitudinally, soft and flexible, and containing within their tough shell a soft black pulp, in which numerous minute, black glossy seeds are imbedded. It possesses a warm, aromatic, sweetish taste, and a strong, peculiar, but agreeable odor. It yields its virtues to water or alcohol.

Properties and Uses.—Aromatic stimulant. Useful in infusion in hysteria, rheumatism, and low forms of fever. It is also considered an aphrodisiac, powerfully exciting the generative system. Much used in perfumery, and to flavor tinctures, syrups, ointments, chocolate, ice-cream, etc. Dose of the powder, from eight to ten grains; of the infusion, made in the proportion of half an ounce to a pint of boiling water, half a fluidounce, three or four times a day.

VERATRUM ALBUM.

White Hellebore.

Nat. Ord.—Melanthaceæ. *Sex. Syst.*—Polygamia Monœcia.

THE RHIZOMA.

Description.—By some Botanists this plant is placed in the class and order of the Sexual System, *Hexandria Trigynia*. *Veratrum Album* is a herbaceous plant, with a perennial, fleshy, oblong, somewhat horizontal, premorse *rhizoma*, about the thickness of a finger, blackish, or yellowish-white externally, whitish, or pale yellowish-gray internally, and beset with long cylindrical fibers of a grayish color, which constitute the true root. The *stem* is erect, thick, round, striated, and from one to four feet in height. The *leaves* are alternate, broad-ovate, acute, entire, plaited longitudinally, and about ten inches long by five broad; they are of a yellowish-green color, and embrace the stem at their base. The *flowers* are yellowish-white, green at the back, eight lines in diameter, and disposed in a terminal panicle; the *segments* spreading, serrulate, and somewhat wavy. In other respects it resembles the *Veratrum Viride*.

History.—White Hellebore is a native of Europe, growing in the mountainous regions of that country, especially on the Alps and Pyrenees. The whole plant is active and poisonous, but the *rhizoma* only is officinal. When dried it is usually found in pieces, from one to three inches long, and nearly an inch in diameter, cylindrical, or in the shape of a truncated cone, whitish or grayish-brown internally, blackish externally, wrinkled, and rough with the remains of the fibers which have been cut off near their origin. It deteriorates by keeping. Its odor is disagreeable when recent, but which is lost by drying, and its taste at first sweetish, becomes intensely and permanently bitter, acrid, and burning. Diluted alcohol is its best solvent. The pulverized root is of

a grayish color. It contains supergallate of veratria, an oily substance consisting of olein, stearin, and a volatile acid, yellow coloring matter, starch, gum, lignin, silica, and various salts of lime and potassa. Two other principles have likewise been detected by Simon, named *barytina* and *jervina*. Its properties are owing to the veratria it contains. (*See Veratria.*)

Properties and Uses.—White Hellebore is a violent emetic and purgative, and has been used in mental diseases, as a diaphoretic in chronic cutaneous diseases, and as a sternutatory in headache, amaurosis, and ophthalmia. Seldom used, however, except externally in the form of decoction or ointment for the cure of itch and other cutaneous eruptions, and as an errhine, diluted with six or seven parts of some mild powder, in gutta serena and lethargic affections. A mixture of three parts of the wine of White Hellebore, and one of the wine of opium has been considerably employed in gouty and rheumatic affections. White Hellebore is a violent, irritant poison, producing, when snuffed up into the nostrils, severe coryza, and when swallowed, urgent vomiting, and profuse diarrhea. When it proves fatal, narcotic symptoms, as stupor and convulsions, are superadded. Dose of the powder, from one to eight grains gradually and cautiously increased, commencing with one grain; of the vinous tincture, from twenty to sixty minims. Its use always requires great care.

Off. Prep.—Unguentum Sulphuris Compositum; Unguentum Veratri Albi.

VERATRUM SABADILLA.

Cevadilla.

Nat. Ord.—Melanthaceæ. *Sex. Syst.*—Polygamia Monoecia.

THE SEEDS.

Description.—The precise origin of this remedy is yet involved in uncertainty; by some, Cevadilla is referred entirely to the *Veratrum Officinale*, which has been variously denominated *Helonias Officinalis*, and *Asagræa Officinalis*; while others consider it the product of the *V. Sabadilla* and *A. Officinalis*, with other plants of the same order. More exact information is required before its origin can be positively determined. The following is a description of two plants from which it is reputed to be obtained:—

VERATRUM SABADILLA of Retzius is a plant three or four feet high, with the leaves radical, numerous, spreading on the ground, ovate-oblong, obtuse, with from eight to fourteen ribs, and glaucous beneath. The scape or flower-stem is erect, simple, and round, and bears a spreading, simple, or but slightly branched panicle of somewhat nodding flowers, supported upon very short pedicels. The flowers are blackish-purple,

approximate in twos and threes; the fertile eventually becoming turned to one side, and the sterile falling off and leaving a scar. The *segments of the perianth* are ovate-lanceolate, and veinless. The *ovaries* are three, oblong, connate, obtuse; *styles* acute, dilated downward; *stigmas* simple. *Capsules* three, in form resembling those of Larkspur, occupying only one side of the stem, and opening at the apex inside. *Seeds* three in each cell, imbricated, curved, blunt on one side, sooty, acrid. This plant grows in Mexico and the West Indies.

ASAGRÆA OFFICINALIS, Lindley, *Veratrum Officinale*, Schlechtendahl, and *Helonias Officinalis* of Don, is a cæspitose plant, bulbous, with the *leaves* linear, tapering to a point, even, smooth, entire, channeled above, carinate at the back, about four feet long, by three lines broad. The *scape* is naked, about six feet high, round, simple, terminating in a very dense, straight, spike-like raceme, eighteen inches long. The *perianth* is deeply six-parted, spreading, yellowish-white, permanent, with linear, thick, veinless, obtuse *segments*, three of which are rather broader than the others. *Filaments* six, somewhat clavate, those opposite the broad segments of the perianth longer than the others, and all longer than the perianth. *Anthers* large, yellow, cordate, obtuse. *Ovary* formed of three cells, united by their sutures, with an obscure *stigma*. *Follicles* three, acuminate, papery; *seeds* scimitar shaped, corrugated, winged. This plant is a native of the eastern side of the Mexican Andes, near Barranca de Tioselo, by the Hacienda de la Laguna, in grassy places.

History.—Cevadilla seeds are brought from Vera Cruz, and usually occur mixed with the fruit of the plant. This consists of tri-capsular follicles, which open above, and present the appearance of single capsules with three cells; they are about three or four lines long, a line and a half thick, obtuse at the base, light brown, or yellowish, smooth, and containing in each capsule, one or two seeds. The seeds are elongated, pointed at each end, flat on one side and convex on the other, somewhat curved, two or three lines long, wrinkled, slightly winged, black or dark brown on the outside, whitish within, hard, inodorous, and of an exceedingly acrid, burning, and persistent taste. They contain veratria combined with gallic acid, fatty matter, *cevadilic* or *sabadillic* acid being a peculiar, volatile fatty acid, yellow coloring matter, wax, gum, lignin, and other unimportant constituents. They yield about 0.58 parts of veratria to every one hundred. Merck has also discovered a peculiar acid, which he has named *veratric acid*; it occurs in colorless crystals, is fusible and volatilizable without decomposition, but slightly soluble in cold water, more soluble in hot water, insoluble in ether, soluble in alcohol, reddens litmus paper, and forms soluble salts with the alkalis. (See *Veratria*.)

Properties and Uses.—Cevadilla seeds have been employed as an anthelmintic, but require much caution in their administration, as they

are a dangerous, acrid, drastic emeto-cathartic. They have also been employed for the destruction of vermin in the hair, but should never be advised for this purpose, as dangerous consequences have resulted from this application of them. Externally applied they are very irritating. The dose is from five to thirty grains, for the expulsion of tænia, and other worms. An extract has proved beneficial in painful rheumatic and neuralgic affections. At present, they are seldom used in practice, their chief employment being for the preparation of veratria.

Off. Prep.—Veratria.

VERATRUM VIRIDE.

American Hellebore.

Nat. Ord.—Melanthaceæ. *Sex. Syst.*—Polygamia Monœcia.

THE RHIZOMA.

Description.—This plant, known also by the names of *Swamp Hellebore*, *Indian Poke*, and *Itch-weed*, has a perennial, thick and fleshy *rhizoma*, tunicated above, solid below, and sending forth numerous whitish radicles. The *stem* is annual, round, solid, striated, pubescent, and from three to six feet high, being, throughout the greater part of its length, closely invested with the sheathing bases of the leaves. The *leaves* are alternate, and gradually decrease in size as they ascend; the lower are from six to twelve inches long, oval, acuminate, pubescent, strongly ribbed and plaited, the lower part of their edges meeting round the stem; the upper leaves are gradually narrower; the uppermost or bracts linear-lanceolate. The *flowers* are numerous, yellowish-green, and arranged in compound racemes, axillary from the upper leaves, and terminal; each flower is accompanied with a boat-shaped, acuminate, downy bract, much longer than its pedicel; *peduncles* roundish, downy. The *perianth* is divided into six oval, acute, nerved segments, of which the alternate ones are the longest, and all contracted at the base into a sort of claw with a thickened or cartilaginous edge. The *stamens* are six, with recurved *filaments*, and roundish, two-lobed *anthers*. *Ovaries* three, cohering, with acute recurved styles as long as the stamens. The *fruit* consists of three capsules, united together, separating at top, and dehiscing on their inner side. *Seeds* flat, winged, imbricated. A part of the flowers at the upper end of the branchlets are barren, and have only the rudiments of styles, those on the lower portion are fruitful.

History.—American Hellebore is indigenous to many parts of the United States, usually growing in swamps, wet meadows, and on the banks of mountain streamlets, flowering from May to July. The *rhizoma* is the official part; it should be collected in autumn, and not kept longer than one year, as its virtues are rapidly impaired by age. It consists of a tunicated top, with a thick, fleshy base, having numerous radicals

attached. When recent it has a disagreeable, fetid odor, which disappears on desiccation. The taste is at first sweetish, afterward bitter, followed by an acrid, pungent, and persistent sensation. In its appearance, as well as its sensible properties, it somewhat resembles white hellebore, and according to Mr. Worthington, of Philadelphia, it contains veratria, gallic acid, extractive, etc. Mr. W. precipitated a cold infusion of the root with subacetate of lead, separated the excess of lead with sulphureted hydrogen, evaporated to one-half, boiled with an excess of magnesia. The precipitate was collected on a filter, dried, treated with boiling alcohol and animal charcoal, and the filtered alcoholic solution evaporated. The light-colored pulverulent residue was nearly insoluble in water, more soluble in ether, and very soluble in alcohol. It melted when heated, and burned without residue; had a burning acrid taste, acted powerfully as a sternutatory, and formed salts with the acids, of which the sulphate, tartrate, and oxalate only were crystallizable. From these properties, Mr. Worthington infers its identity with veratria; but it is probable that it is not veratria, but like *colchicia*, a distinct, though analogous principle.

Properties and Uses.—Its effects upon the system are similar to those of the *V. Album*, although its cathartic action is denied by Dr. Osgood, who states that it reduces the frequency and force of the pulse, sometimes as low as thirty-five strokes in the minute. It is also an emetic, and the action is often violent and long continued. In addition to which, it is said to increase most of the secretions, and when freely taken, to exercise a powerful influence over the nervous system, indicated by faintness, somnolency, vertigo, headache, dimness of vision, and dilated pupils. Prof. Tully, of New Haven, regards it as an excellent substitute for colchicum, in gouty, neuralgic and rheumatic affections, to which diseases it seems best adapted. It is a remedy deserving the attention of the profession. The best forms of administration are the tincture or extract; and it should never be given in doses sufficient to produce vomiting. Dose of the powder, from four to six grains; of a saturated tincture, ten drops gradually increased until some effect is produced; of the extract, or inspissated juice, one-third of a grain, gradually increased. The *V. Parviflorum* and *V. Angustifolium*, of this country, are probably active, and should be examined.

Dr. W. C. Norwood, of Cokesbury, S. C., in some recent communications published in the Southern Medical and Surgical Journal, states that from actual experiments made by himself this plant has proved:—

1. Slightly acrid, and confining this action mostly to the mouth and fauces.

2. Expectorant, and unsurpassed by any other article for which this property is claimed.

3. Diaphoretic, being one of the most certain belonging to the Materia Medica; often exciting great coolness or coldness of the surface; some-

times rendering the skin merely soft and moist, and at others producing free and abundant perspiration, without reducing or exhausting the system.

4. Adanagic, deobstruent, or alterative, far surpassing iodine, and from which much advantage may be expected in the treatment of cancer and consumption.

5. Nervine, and never narcotic. This property renders it of great value in the treatment of painful diseases, and such as are accompanied with spasmodic action, convulsions, morbid irritability, and irritative mobility, as in chorea especially, epilepsy, pneumonia, puerperal fever, neuralgia, etc. And it produces its effects in this respect, without stupefying and torpifying the system, as opium is known to do.

6. Emetic; it is slow, but certain and efficient, rouses the liver to action during its operation, and vomits without occasioning the prostration or exhaustion which follows the action of most other emetics. It is also superior to the majority of emetics, in not being cathartic. It is peculiarly adapted as an emetic in whooping-cough, croup, asthma, scarlet fever, and in all cases where there is much febrile or inflammatory action.

7. Arterial sedative. This he considers its most valuable and interesting property, and for which it stands unparalleled and unequalled as a therapeutic agent.

8. In small doses, it creates and promotes appetite, beyond any agent with which we are acquainted.

Dr. Norwood recommends the following formula for the tincture: Take of the dried root of *Veratrum Viride*, eight ounces; alcohol .835 sixteen ounces. Macerate for two weeks, express, and filter. To an adult, eight drops are given, and which must be repeated every three hours, increasing the dose one or two drops every time, until nausea or vomiting, or a reduction of the pulse to 65 or 70 ensue; then reduce to one-half in all cases. Females and persons from fourteen to eighteen, should commence with six drops, and increase as above; children from two to five years to begin with two drops, and increase one drop only; below two years of age, one drop. When nausea, vomiting, or other unpleasant effects ensue from its administration according to the above directions, they may be speedily relieved by one or two portions of syrup of morphia and tincture of ginger, or brandy and laudanum. He has reduced the pulse by its use, to 35 beats per minute, without exciting the least nausea or vomiting. In pneumonia, typhoid fever, and many other diseases, it must be continued for from three to five or seven days after the symptoms have subsided; and in typhoid fever, while using the veratrum, quinia is absolutely inadmissible. It is administered in a little sweetened water. Its employment may be continued indefinitely, in moderate doses, or short of nausea, without the least inconvenience. The correctness of Dr. Norwood's statements will be determined by future investigations.

VERBASCUM THAPSUS.

Mullein.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES AND FLOWERS.

Description.—Mullein is a biennial plant, with an erect, round, rigid, stout, hairy stem, from three to five feet in height, and winged by the decurrent bases of the leaves. The leaves are alternate, oblong, acute, decurrent, indented at the margin, rough, and densely tomentose on both sides. The flowers are of a golden yellow color, rotate, nearly sessile, and are arranged in a dense, spiked, club-shaped raceme; *calyx* five-parted and downy; *corolla* five-lobed, rotate, lobes broad and rounded, somewhat unequal; *stamens* five, the two lower smooth, the rest downy. *Capsule* or *pod*, ovoid-globose, two-valved, many-seeded.

History.—Mullein is common to the United States, growing in neglected fields, along roadsides, and in newly cleared places, flowering from June to August. Some Botanists consider it to have been introduced from Europe. The leaves and flowers are the parts used. They have a slight, somewhat narcotic smell, rather agreeable, and a feebly mucilaginous, herbaceous, and bitter taste, and yield their virtues to boiling water. The flowers are said to contain volatile oil, yellow resin, saccharine matter, chlorophylle, malic and phosphoric acids.

Properties and Uses.—Mullein is demulcent, diuretic, anodyne and antispasmodic. The infusion is useful in coughs, catarrh, hemoptysis, diarrhea, dysentery and piles. Its diuretic properties are rather weak, yet it is very useful in allaying the acidity of urine, which is present in many diseases. It may be boiled in milk, sweetened, and rendered more palatable by the addition of aromatics, for internal use, especially bowel complaints. A fomentation of the leaves also forms an excellent local application for inflamed piles, ulcers and tumors. The leaves and pith of the stalk form a valuable cataplasm in white swellings, and infused in hot vinegar or water, it makes an excellent poultice to be applied to the throat in cynanche tonsillaris, cynanche maligna, and mumps. The seeds, it is said, will rapidly pass through the intestines, and have been successfully used in intestinal obstructions. They are narcotic, and have been used in asthma, infantile convulsions, and to poison fish. The infusion may be drank freely. The flowers, placed into a well-corked bottle, and exposed to the action of the sun, are said to yield a fine relaxing oil.

Off. Prep.—Cataplasma Verbasci.

VERBENA HASTATA.

Vervain.

Nat. Ord.—Verbenaceæ. Sex. Syst.—Didynamia Gymnospermia.

THE ROOT.

Description.—Vervain, sometimes known by the names of *Wild Hys-sop*, or *Simpler's Joy*, is an erect, tall, elegant, and perennial plant, with an obtusely four-angled *stem*, three or four feet high, and having opposite, paniculate branches above. The *leaves* are opposite, petiolate, lanceolate, acuminate, rough, and incisely serrate; the lower often lobed or somewhat hastate. The *flowers* are small, purplish-blue, sessile, tetrandrous, and arranged in long, erect, slender, imbricated, terminal and axillary, paniced spikes. *Calyx* five-toothed; *corolla* funnel-form, limb five-cleft, nearly equal; *seeds* four.

History.—Vervain is indigenous to the United States, growing along roadsides, and in dry, grassy fields, flowering from June to September. The root is the part used; it is woody and fibrous, faintly odorous and of a bitter, somewhat astringent, nauseous taste, and imparts its properties to water. There are several varieties of this plant, as the *V. Urticifolia*, or nettle-leaved vervain, with white flowers, the *V. Spuria*, with blue flowers, and others, the roots of which possess similar properties, but in a milder degree than the *V. Hastata*. Sometimes the leaves of *V. Hastata* are used instead of the root, but they are less active.

Properties and Uses.—Vervain is tonic, emetic, expectorant, and sudorific. As an emetic and sudorific it has proved beneficial in intermittent fever, given in warm infusion or in powder. In all cases of colds and obstructed menstruation it may be used as a sudorific. Taken cold, the infusion forms a good tonic in some cases of debility, anorexia, and during convalescence from acute diseases. It has been reputed valuable in scrofula, visceral obstructions, gravel and worms. The following application has been recommended as effectual in promoting the absorption of the blood effused in bruises, and in allaying the attendant pain: Take of vervain, senna and white pepper, of each equal parts. Make a cataplasm by mixing with the white of eggs. Dose of the powdered root, from one to two scruples; of the infusion, from two to four fluidounces, three or four times a day, or oftener if it is desired to vomit. The root of *V. Urticifolia* boiled in milk and water, with the inner bark of *Quercus Alba*, and the decoction drank freely, is said to be an excellent antidote for poisoning from the *Rhus Toxicodendron*. The *V. Officinalis* is a European plant, possessing similar properties with the above, but less active.

VERNONIA FASCICULATA.

Ironweed.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia *Æqualis*.

THE ROOT.

Description.—This is an indigenous, perennial, coarse, purplish-green weed, with a tall striate or grooved, tomentose *stem*, from three to ten feet in height. The *leaves* are from four to eight inches long, by one or two broad, narrow-lanceolate, tapering to each end, serrulate, alternate, smooth above, the lower ones petiolate. The *flower-heads* are numerous, in a compact or loose, somewhat fastigiate cyme. The *corolla* is showy, dark purple, tubular, twice as long as the involucre. *Involucre* smooth, ovoid-campanulate; *scales* appressed, all but the lowest rounded and obtuse, without appendage.

History.—Ironweed is a very common plant in the Western States, growing in the woods and prairies, and along river-streams, and flowering from July to September. The root, which is the part used, is bitter, and imparts its properties to water or alcohol. The *Vernonia Novboracensis*, growing in the Eastern, Western, and Middle States, and its variety *V. Præalta*, bearing purple flowers, and the *V. Tomentosa*, with some other species, possess similar medicinal properties.

Properties and Uses.—Ironweed is a bitter tonic, deobstruent, and alterative. In powder or decoction, the root is beneficial in amenorrhea, dysmenorrhea, leucorrhea, and menorrhagia. In intermittent, remittent, and bilious fevers, the decoction or a saturated tincture has been recommended. Said to have been useful in scrofula, and some cutaneous diseases. Dose of the decoction, one or two fluidounces; of the tincture, one or two fluidrachms. The leaves or powdered root in the form of poultice make an excellent discutient application to tumors.

VERONICA OFFICINALIS.

Speedwell.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Diandria Monogynia.

THE LEAVES AND TOPS.

Description.—This is a roughish-pubescent plant, the *stem* of which is prostrate, rooting at the base, from six to twelve inches long, with ascending branches. The *leaves* are opposite, vary from ovate to obovate, but are generally elliptical, short-petioled, obtuse, serrate, mostly narrowed to the base, and an inch or an inch and a half long. The *flowers* are pale-blue, and arranged in long, axillary, erect, dense, many flowered, pedunculate racemes; *pedicels* shorter than the calyx. *Calyx* four-parted; *corolla* rotate. The *pod* or *capsules* is puberulent, obovate-triangular, emarginate, strongly flattened, several seeded.

History.—Speedwell is a native of Europe, and now very common in North America, growing on dry hills, and in woods and open fields, flowering from April to August. The leaves and tops are employed; they have a faint odor, and a slightly bitter and aromatic taste. The *V. Beccabunga*, or brook-lime, is found in most of the Eastern and Northern States, growing in small streams and near watercourses; this, together with the *V. Anagallis*, *V. Scutellata*, *V. Agrestis*, and *V. Peregrina*, possesses somewhat similar properties. They all impart their virtues to water.

Properties and Uses.—Speedwell is tonic, expectorant, diaphoretic, and diuretic. It was formerly administered in pectoral and nephritic complaints, diseases of the skin, icterus, and in the treatment of wounds. Likewise reputed beneficial in scrofula, and other diseases where alteratives are indicated, especially the *V. Peregrina*; to be given internally, and used as a wash. The *V. Beccabunga* is antiscorbutic, diuretic, febrifuge, and emmenagogue, and said to be beneficial in cases of obstructed menstruation, scurvy, fevers, and coughs. The decoction of the plants may be used freely.

VIBURNUM OPULUS.

High Cranberry.

Nat. Ord.—Caprifoliaceæ. *Sex. Syst.*—Pentandria Trigynia.

THE BARK.

Description.—This is the *Viburnum Oxyccoccus* of Pursh; it is a nearly smooth and upright shrub or small tree, rising from five to twelve feet in height; the *stems* are several from the same root, branched above. The *leaves* are three-lobed, three-veined, broadly wedge-shaped or truncate at base, broader than long; the *lobes* divaricate, acuminate, crenately-toothed on the sides, entire in the sinuses; the *petioles* have two or more glands at the base, and are channeled above. The *flowers* are white or reddish-white, and are disposed in rayed, pedunculated cymes; the marginal flowers are large and sterile, the inner flowers much smaller and fertile. The *fruit* is ovoid, red, very acid, ripens late, and remains upon the bush after the leaves have fallen; it resembles the common cranberry, and is sometimes substituted for it. The *V. Roseum*, Snow-ball, or Guelder-rosetree, is a cultivated European variety, with the whole cyme turned into large sterile flowers.

History.—This is a handsome indigenous shrub, growing in low rich lands, woods, and borders of fields, in the northern part of the United States and Canada, flowering in June, and presenting at this time a very showy appearance. The flowers are succeeded by red and very acid berries, resembling low cranberries, and which remain through the winter. The bark is the official part; as met with in the shops, it is in

thin, longitudinally curved pieces, from one-fourth of an inch to two or three inches in length, and from two to six lines in width, with a dark-grayish epidermis, and whitish-yellow, or reddish-yellow internal integument; it has no smell, and a peculiar, not unpleasant, bitterish and astringent taste. It is frequently put up by the Shakers, when it is somewhat flattened from pressure. It yields its properties to water or diluted alcohol. The Pharmaceutical Institute of the city of New York, profess to have obtained the active principle of this plant, which they have called *Viburine*. I have not been able to learn its mode of preparation, nor have I seen any of it, and therefore cannot recommend it. There is a great disposition among some of the manufacturers of our concentrated remedies to keep their processes secret; this is very reprehensible, and the maxim cannot be too frequently repeated—"Never use a prepared remedy unless its mode of preparation is made known"—to do differently savors of charlatanism. Beside, great imposition may be practiced upon physicians by designing and speculating individuals.

Properties and Uses.—High-Cranberry-bark is a powerful antispasmodic, and in consequence of this property, it is more generally known among Eclectic practitioners by the name of *Cramp Bark*. It is very effective in relaxing cramps and spasms of all kinds, as asthma, hysteria, cramps of the limbs or other parts in females, especially during pregnancy, and it is said to be highly beneficial to those who are subject to convulsions during pregnancy, or at the time of parturition, preventing the attacks entirely, if used daily for the last two or three months of gestation. The following, forms an excellent preparation for the relief of spasmodic attacks, viz: Take of Cramp Bark two ounces, Sculleap, Skunkcabbage, of each one ounce, Cloves half an ounce, Capsicum two drachms. Have all in powder, coarsely bruised, and add to them two quarts of good sherry or native wine. Dose, one or two fluidounces, two or three times a day. Dose of the decoction, or vinous tincture of Cramp Bark, two fluidounces, two or three times a day. It may be proper to remark here that I have found a poultice of low cranberries very efficacious in indolent and malignant ulcers; and applied round the throat in the inflammation and swelling attending scarlatina-maligna, and other diseases, it gives prompt and marked relief. Probably, the High-Cranberries will effect the same results. (See *Cataplasma Oxycocci*.)

VIBURNUM DENTATUM, Arrow-wood, or Mealy-tree, called by the former name on account of its long, straight, slender branches or young shoots, is a somewhat smooth shrub, from six to twelve feet in height, growing in low grounds, damp woods and thickets, throughout the United States, with roundish-ovate, dentate-serrate, furrow-plaited leaves, on long, slender petioles. The leaves are two or three inches in diameter, the upper pair oval, the veins beneath prominent, parallel, and

pubescent in their axils. The *flowers* are white, in pedunculate cymes, and appear in June. The *fruit* consists of small ovoid-globose, dark-blue berries.

The bark of this tree is ash-colored, and is employed as a diuretic and detergent, and has been highly recommended as an internal and external agent to cure cancer ; the infusion to be used freely. It certainly deserves the attention of the profession in their treatment of this formidable disease. It may also be used in extract, pills, or plaster.

Off. Prep.—Extractum Viburni Hydro-alcoholicum ; Tinctura Viburni Composita.

VIBURNUM PRUNIFOLIUM.

Black Haw.

Nat. Ord.—Caprifoliaceæ. *Sex. Syst.*—Pentandria Trigynia.

THE BARK OF THE ROOT.

Description.—This shrub or tree, also known by the name of *Sloe*, is indigenous to this country, growing to the height of from ten to twenty feet. The *branches* are spreading, some of them often stunted and naked, giving the plant an unthrifty aspect. The *leaves* are about two inches long, and nearly as wide, roundish-ovate, smooth, shining above, obtuse at both ends, acutely serrate, with uncinat teeth, and situated on short petioles, slightly margined with straight, narrow wings. The *flowers* are white, in large, terminal, and sessile cymes. The *fruit* consists of ovoid-oblong, sweet, edible, blackish berries.

History.—This tree is found throughout the United States, being most abundant in the Middle and Southern States. It flowers from March to June, and presents at this time a very handsome appearance. It is usually found in woods and thickets. The bark of the roots, stem, and branches are medicinal, but that of the root is preferred. It is fawn-colored externally, with a feeble odor, and a very bitter, slightly aromatic taste. Water or alcohol extracts its properties. It is readily pulverized when dry, and affords a reddish-colored powder tinged with gray. It is said to contain extractive matter, gum, tannin, gallic acid, and a peculiar resinous principle, for which the name of *Viburnin* has been proposed. It is obtained by the usual process for separating the resinous principles from plants, and is a light reddish-brown powder, intensely bitter, possessing the properties of the bark in a concentrated form.

Properties and Uses.—Black Haw is tonic, astringent, diuretic, and alterative ; the decoction has been used as a gargle in aphthæ, as a wash to indolent ulcers, and ophthalmic affections ; and internally in chronic diarrhea, dysentery, and palpitation of the heart. It appears to exert an especial tonic influence upon the uterus, and is highly recommended

in cases of threatened abortion, and as a preventive in cases of habitual miscarriage; in the latter case its use should commence a week or two previous to the aborting period, and be continued through the remaining period of pregnancy. It has also proved useful in relieving severe after-pains. The infusion may be given in half fluidounce doses, several times a day; or the tincture, in doses of a fluidrachm, four or five times a day. The powder may be given in half drachm, or drachm doses.

VIOLA PEDATA.

Blue Violet.

Nat. Ord.—Violaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE WHOLE PLANT.

Description.—Blue-Violet, or as it is sometimes called, *Bird's-foot Violet*, is an indigenous, stemless plant, glabrous, with the leaves and scapes all from perennial, fleshy, premorse, subterranean rootstocks. The *leaves* are pedately five to nine-parted; the lobes being linear-lanceolate, obtuse, and nearly entire. *Petioles* with long, ciliate stipules at base. The *flowers* are large, very showy, an inch broad, pale or deep lilac-purple, and fragrant. *Peduncles* somewhat four-sided, much longer than the leaves. The divisions of the *calyx* are linear, acute-ciliate, emarginate behind. *Petals* veinless, entire, and beardless. *Spur* or *beak* obscure. The *stigma* is large, compressed at the sides, obliquely truncate, and perforate at the apex.

History.—This plant is common to the United States, growing from New England to Carolina, and west to Missouri, in dry sandy fields and rocky woods, flowering in May and June. The herb and root are used, and impart their virtues to water.

The *Viola Odorata* or *Sweet Violet* of Europe, is much cultivated in this country on account of its beautiful flowers, which appear in April and May. It is a small, pretty, creeping plant, the runners of which are furnished with fibrous *roots*, and send up annually tufts of leaves and flowers. The *leaves* are cordate, crenate, nearly smooth, and supported on long petioles. The *flowers* are small and fragrant, at the summit of delicate, quadrangular, channeled, bracted, radical *peduncles*. The *stipules* are lanceolate and toothed. The *petals* are obovate, obtuse, unequal, bluish-purple, or deep violet color, except at the claws, which are whitish, and longer than the obtuse, ovate *sepals*. The two lateral petals are spreading, with a hairy line toward the base, the inferior furnished with a large blunt spur, and the two upper reflected. The *stamens* are in the center with very short filaments, and *anthers* slightly cohering by an orange-colored membranous expansion. *Stigma* hooked, naked; *capsules* turgid, hairy; *seeds* turbinate, pallid.

The flowers of this species have a very slightly bitter taste, and a peculiar, agreeable odor, which, however, occasions faintness and giddiness with some persons. Their odor is lost by drying. They should be gathered before being fully blown, deprived of their calyx, and rapidly dried in a heated room. An infusion of them affords a very delicate test for acids and alkalies, the former changing it to red, the latter to green. Three or four drachms of the seeds, made into an emulsion with sugar and water, act as a mild and pleasant purgative. The roots are emetic and purgative, but are very uncertain in their action. A peculiar alkaline principle has been detected in this plant, called *Viola*, it bears some resemblance to *Emetia*. It is probably contained in other species of *Viola*.

Properties and Uses.—Blue Violet is mucilaginous, emollient, and slightly laxative; also antisypilitic, and forms a valuable remedy for this disease, when combined with *Corydallis Formosa*. Has been used in pectoral, nephritic, and cutaneous affections, especially crusta lactea. The plant should be used when fresh, as drying destroys its active properties. The seeds of the European sweet violet, *Viola Odorata*, have been used in gravel, and for similar purposes as the *V. Pedata*. The *V. Tricolor*, or pansy, may be used as a substitute. The roots of these plants are bitterish and slightly acrid, and in doses of from eight to ten grains are tonic; from twenty-five to thirty grains, purgative; and from forty to sixty grains, emetic.

The *Viola Ovata*, or rattlesnake violet, has been highly recommended in the bites of rattlesnakes, the infusion to be freely administered; and the infusion used internally, with a fomentation of the leaves locally applied, have proved efficacious in obstinate chronic ophthalmia; a similar course is reputed very valuable in scrofulous diseases. Probably all the species possess analogous properties; they are undoubtedly more active agents than generally supposed, and deserve further investigation.

VISCUM FLAVESCENS.

Mistletoe.

Nat. Ord.—Loranthacæ. *Sex. Syst.*—Diœcia Tetrandria.

THE LEAVES.

Description.—This is the *Viscum Verticillatum* of Nuttall, and *Viscum Album* of Walter; it is a yellowish-green, succulent parasite, growing on the branches and trunks of old trees, especially elms, oaks, hickories, etc. The *stems* are jointed, an inch or an inch and a half in length, rather thick, with many round, spreading, opposite, and sometimes verticillate, terete *branches*. The *leaves* are opposite, cuneate-obovate, three-veined, obtuse, smooth, entire, contracted at the base into a short petiole, and from nine to sixteen lines long, by from four to nine broad.

The *flowers* are small, greenish-white, sterile ones mostly three-parted, and arranged in axillary, solitary spikes, about as long as the leaves. *Fruit* globose, yellowish-white, smooth, semi-transparent, with a viscous pulp, in clusters, and contain one fleshy seed; they remain throughout the winter.

History.—This parasitic shrub is found growing on various trees; but that which is found on the oak is preferred. The bark and leaves have a peculiar disagreeable odor, and a nauseous, sweetish, slightly bitter taste. The proper time for collection is in November, when it should be gradually dried, pulverized, and kept in a well-stopped bottle. It should never be kept more than a year, as age impairs its active qualities. The mistletoe growing on the water or black elm (*Ulmus Nemo-ralis*), and on the water-oak (*Quercus Aquatica*), is reputed to possess the most energetic medicinal virtues.

Properties and Uses.—Narcotic, antispasmodic, and tonic. Has been found beneficial in epilepsy, insanity, paralysis, and other nervous diseases. In using this agent it is always necessary to regulate the condition of the stomach and bowels, and the menstrual discharge, and other faulty secretions, and remove worms, if any are present, previous to its exhibition. It may be given in doses of from thirty to sixty grains, and gradually increased to three or four drachms, three or four times a day, and if it produces sleep or other narcotic effects, the doses must be diminished. This plant is by no means inert, and its failures in the hands of some practitioners must be attributed to the want of proper doses, or to the employment of an article which age or exposure to the air had injured. The powder is best given in an infusion of valerian.

VITIS VINIFERA.

The Grape.

Nat. Ord.—Vitaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE FRUIT, AND ITS FERMENTED JUICE.

Description.—The Grapevine is well known nearly all over the globe; yet it is so variable in its character that no description will apply to all the kinds. The *leaves* are more or less lobed, sinuated, smooth, pubescent, downy, or naked; are flat, crisped, or even plaited, and either of a pale-green or dark-green color. The *branches* may be prostrate, climbing, or erect, and tender or hard; the *racemes* or *bunches* are loose or compact, ovate or cylindrical. The *fruit* or *berries* are red, yellow, purple, white, or pale; globose, ovate, or oblong in form; and sweet, murky, or austere in taste. The *seeds* are variable in number, and sometimes by abortion are wholly wanting.

History.—The Grapevine grows wild in the south of Asia and in Greece, and was, probably, first cultivated in the East, but at what period, it is impossible to say; it must have been known to the antedilu-

vian world, as we are told in Scripture, that Noah, after leaving the ark, planted a vineyard, and drank of the wine. At present it is cultivated in the warm temperate climates of Europe and America. The leaves and tendrils are somewhat astringent, and were formerly employed in diarrhea, hemorrhages, and other morbid discharges. The juice of the stem has also had medicinal virtues attributed to it, and is often added at the present day to washes for improving the hair and removing baldness. The juice of the unripe fruit is called *Verjuice*, and contains malic, citric, tartaric, and racemic acids, with bitartrate of potassa, sulphates of potassa and lime, a little tannic acid, etc. The juice of the ripe fruit is called *Must*, and contains sugar, gum, malic acid, bitartrate of potassa, various inorganic salts, etc.: when fermented it is called *Wine*. So long as the ripe grape remains entire, it undergoes little change beyond gradual desiccation and a conversion of its acid into sugar; but if the grape be crushed, or its juice expressed, and the temperature maintained at between 60° and 70°, fermentation ensues through the action of the air, and of the insoluble glutenoid principle existing in the husk, which acts the same part as that of yeast in the fermentation of malt or solutions of sugar. The consequence is, the must becomes warmer, the sugar gradually disappears and carbonic acid escapes, which causes a *head*—the name given to the more solid parts which are thrown to the surface in a hemispherical mass of froth; alcohol is now formed, changing the liquor from a sweet to the vinous flavor, and if the grapes were red, the liquor assumes a deep-red color. After a while the fermentation slackens, when it becomes necessary to accelerate it by thoroughly mixing the contents of the vat. When the juice contains too large a proportion of sugar, some tartar is added to it, and where the saccharine matter is deficient, sugar is added. When the liquor has acquired a strong vinous taste, and becomes perfectly clear, the wine is considered formed, and is racked off into casks; but even at this stage of the process, the fermentation continues for several months longer; during which period, a frothy matter is formed, which for the first few days collects round the bung, but afterward precipitates along with coloring matter and tartar, forming a deposit which constitutes the *Wine Lees*.

Climate, soil, and many other circumstances, have much influence upon the quality of the wine; and during its preparation, not only does it require different treatment, according to the character of the wine, but it also requires great care, attention, and practical skill to manage the fermentation properly.

Wines are divided into the Red and White, according to their color; and according to their taste and other qualities, are either spirituous, sweet, dry, light, sparkling, still, rough or acidulated. *Red wines* are prepared from the must of black grapes, fermented with their husks; *White wines*, from white grapes, or from the juice of black grapes

fermented apart from their husks. When the process of fermentation is arrested at an early stage, while a considerable part of the sugar remains unaltered, *Sweet wines* are formed. When the wines are bottled before the fermentation is fully completed, the process continuing gradually in the bottle, impregnating the liquor with the carbonic acid which is generated and cannot escape, it renders it effervescent, forming the *Sparkling wines*. When from the presence of a large proportion of saccharine matter, fermentation proceeds until checked by the alcohol produced, generous or *Spirituuous* wines are the result. When the sugar and ferment are in considerable amount, and in the proper relative proportions for mutual decomposition, the wine will be strong-bodied and sound, without any sweetness or acidity, and is called *Dry*. The *Still wines* are those in which fermentation proceeds, until the greater part of the sugar has disappeared; they do not effervesce. *Light wines* are those in which only a small proportion of saccharine matter exists in the grape-juice, and consequently a small amount only of alcohol is generated. The *Rough* or *Astringent* wines owe their flavor to a portion of tannic acid derived from the husks of the grape, and the *Acidulous* and *Sparkling* wines to the presence of carbonic acid, or in the former instance to an unusual proportion of tartar. Wines are manufactured in many countries, and are known by various names, according to their source. Those most usually employed in medicine are Port, Sherry, Claret, Madeira, and Malaga wines.

Port wine is of a deep purple color, and when recent is rough, strong and slightly sweet; it is the strongest of wines in common use; when too long kept it becomes deteriorated. Considerable quantities of brandy are generally added to it, which causes its heating quality on the palate.

Sherry is of a deep-amber color, and when good possesses a dry, aromatic flavor and fragrancy, without any acidity; it ranks among the stronger white wines, and is indicated in this country and England as the official wine.

Claret is a red wine, and ranks as a light wine; it has a deep purple color, and when good, a delicate taste, in which the vinous flavor is blended with slight acidity and astringency. The most esteemed kinds are the Medoc clarets, called *Château-Lafite*, *Château-Margaux*, *Château-Latour*, and *Château-Haut Brion*.

Madeira is the strongest white wine in general use. It is a slightly acid wine, and when of proper age and in good condition, has a rich, nutty, aromatic flavor. All these wines, are, however, much subject to adulteration, and some care must be taken, in order to obtain a pure article.

The intoxicating ingredient in all wines is the alcohol which they contain; and hence their relative strength depends upon the quantity

of this substance entering into their composition. The alcohol, however, naturally in wine, is so blended with its other constituents as to be in a modified state, which renders it less intoxicating and less injurious than the same quantity of alcohol separated by distillation and diluted with water. Mr. Brande has published a very interesting table, giving the per centage by measure of alcohol of sp. gr. 0.825 in different kinds of wine. The following abstract contains his principal results:—

	Alcohol. per cent.		Alcohol. per cent.
Lissa, average.....	25.41	Cape Madeira, average.....	20.51
Raisin wine, average.....	25.12	Grape wine.....	18.11
Marsala, [Sicily Madeira,] average	25.09	Calcavella, average.....	18.65
Port.....	25.83	Vidonia.....	19.25
Ditto.....	24.29	Alba flora.....	17.26
Ditto.....	23.71	Malaga.....	17.26
Ditto.....	23.39	White Hermitage.....	17.43
Ditto.....	22.30	Rousillon, average.....	18.13
Ditto.....	21.40	Claret.....	17.11
Ditto.....	19.00	Ditto.....	16.32
Average.....	22.96	Ditto.....	14.08
Madeira.....	24.42	Ditto.....	12.91
Ditto.....	23.93	Average.....	15.10
Ditto (Sercial).....	21.40	Malmsey Madeira.....	16.40
Ditto.....	19.24	Lunel.....	15.52
Average.....	22.27	Sheraaz.....	15.52
Sherry.....	19.81	Syracuse.....	15.28
Ditto.....	19.83	Sauterne.....	14.22
Ditto.....	18.79	Burgundy, average.....	14.57
Ditto.....	18.25	Hock, average.....	12.08
Average.....	19.17	Nice.....	14.63
Teneriffe.....	19.79	Barsac.....	13.86
Colares.....	19.75	Tent.....	13.30
Lachryma Christi.....	19.70	Champagne, average.....	12.61
Constantia, white.....	19.75	Red Hermitage.....	12.32
Ditto, red.....	18.92	Vin de Grave, average.....	13.37
Lisbon.....	18.94	Frontignac, Rivesalte.....	12.79
Bucellas.....	18.49	Côte Rotie.....	12.32
Red Madeira, average.....	20.35	Tokay.....	9.88
Cape muschat.....	18.25		

Beside the grape, a number of other fruits yield a juice susceptible of the vinous fermentation. The infusion of malt, also, is capable of undergoing this process, and becomes converted into the different kinds of porter and ale. The product in all these cases, though not commonly called a wine, is nevertheless a vinous liquor, and may be classed among the wines properly so called. The following is a list of these vinous liquors, together with the per-centage of alcohol which they contain, as ascertained by Mr. Brande. Currant wine, 20.55; gooseberry wine, 11.84; orange wine, 11.26; elder wine, 8.79; cider, from 5.21 to 9.87; perry, 7.26; mead, 7.32; Burton ale, 8.88; Edinburgh ale, 6.20; brown stout, 6.80; London porter, 4.20; small beer, 1.28.

The native *Catawba* grape, introduced to public notice by Major Adlum, of Washington city, is a superior wine grape, producing a most excellent wine, which will undoubtedly supersede the use of all foreign wines, at least, for medical and pharmaceutical uses. Mr. N. Longworth, of Cincinnati, has been for a long time engaged in the cultivation of this and other kinds of grapes, as well as in the manufacturing of *native wines*, and by dint of perseverance and careful investigation has succeeded in preparing wines which are fully equal to those of foreign origin. Longworth's *Catawba*, and *Sparkling Catawba*, are becoming known throughout the country as superior articles, and their purity and freedom from adulterations render them preferable in all instances where these agents are indicated or required.

Wines consist chiefly of water and alcohol, with grape-sugar, gum, extractive, coloring matter, tannic, malic, and carbonic acids, bitartrate of potassa, tartrate of lime, volatile oil, and cœnanthic ether. The presence of these constituents varies according to the kind of wine, a part being absent in some and present in others; thus sugar is present in sweet wines, tannic acid in rough wines, and carbonic acid in the sparkling varieties.

Many of the imported wines are subject to adulteration, some of which it is difficult to detect. The addition of lead may be ascertained by the black precipitate occasioned on testing the wine with sulphureted hydrogen; the presence of lime by the large amount of precipitate occasioned by the addition of a solution of oxalate of ammonia. Many counterfeit or spurious wines are also prepared, some of which are decidedly injurious in their effects upon the stomach, and when relied upon as therapeutic agents, always produce mischief and disappointment. *Port* is frequently imitated with a mixture of real port, cider, juice of elder-berries, brandy, logwood and alum. *Madeira* is likewise frequently met with of a spurious character. *Champagne* is seldom met with in this country, unless it be an imitation, hence, the great preference given all over the country to Longworth's *Sparkling Catawba*, which is fully equal to the imported Champagne. An excellent imitation of Champagne wine is made as follows: Take of good cider, (crab-apple cider is the best), twenty-eight gallons; fourth-proof brandy one gallon; genuine Champagne wine five gallons; milk one pint, bitartrate of potassa, half a pound. These are mixed together, allowed to stand for a time, and bottled while fermenting.

When quite ripe, the grape is a most pleasant and grateful fruit, and on account of its refreshing properties, is admirably adapted to febrile complaints; in large quantities it is diuretic and gently laxative, but eaten moderately will be found beneficial to those disposed to diarrhea or dysentery; it is also useful in many instances of acid stomach. Grapes are also dried in several ways; the most esteemed is to partially cut the stalks of the bunches before the grapes are perfectly ripe, and allow

them to dry upon the vine; or, they may be picked when properly matured, steeped for a short time in an alkaline ley, and then dried. Dried grapes are the *raisins* (*uva passa*) of commerce, of which there are several varieties, the *Malaga*, *Smyrna*, and *Corinthian raisins* or *currants*, as they are commonly called in this country, of which the first named is considered the best. The raisins of commerce are prepared from the grapes of the Mediterranean countries. They contain more sugar than grapes, as may often be seen by its efflorescence on the surface of the raisins or its concretion in small masses within their substance. *Grape-sugar* is not so sweet as cane-sugar, is less soluble in cold water, is more soluble in cold alcohol, forms a syrup of less viscosity, and is identical with sugar of starch.

Properties and Uses.—Wine is consumed in most civilized countries; but in a state of health it is at least useless, if not absolutely pernicious. The degree of mischief which it produces, depends very much on the character of the wine. Thus the light wines of France are comparatively innocuous; while the habitual use of the stronger ones, such as port, madeira, sherry, etc., even though taken in moderation, is always injurious, as having a tendency to induce gout and apoplexy, and other diseases dependent on plethora and over-stimulation. All wines, however, when used habitually in excess, are productive of bad consequences. They weaken the stomach, produce diseases of the liver, and give rise to dropsy, gout, apoplexy, tremors, and not unfrequently mania. Nevertheless, wine is an important medicine, productive of the best effects in certain diseases and states of the system. As an article of the *Materia Medica*, it ranks as a stimulant and antispasmodic. In the convalescence from protracted fever, and in sinking of the vital powers, it is frequently the best remedy that can be employed. In certain stages of typhoid fevers, and in extensive ulceration and gangrene, this remedy, either alone, or conjoined with bark or opium, is often our main dependence. In low febrile affections, if it increase the fullness and lessen the frequency of the pulse, mitigate delirium, and produce a tendency to sleep, its further use may be deemed proper; but on the contrary, if it render the pulse quicker, augment the heat and thirst, produce restlessness, or increase delirium, it should be immediately laid aside as injurious. In some convulsive diseases, as for example tetanus, wine, liberally given, has been found useful.

Wine, when used medicinally, should be sound, and good of its kind; for otherwise it will disagree with the stomach, and prove rather detrimental than useful. The individual wine selected for internal exhibition must be determined by the nature of the disease, and the particular object in view. *Teneriffe* is a good variety of white wine for medicinal use, being of about a medium strength, and agreeing very well with most stomachs. *Sherry*, when in good condition, is also a fine wine, and, being free from all acid, is to be preferred whenever the stomach is

delicate, or has a tendency to dyspeptic acidity. Unfortunately, however, it is of very unequal quality. Good *Madeira* is the most generous of the white wines, particularly adapted to the purpose of resuscitating debilitated constitutions, and of sustaining the sinking energies of the system in old age. The slight acidity, however, of pure *Madeira* causes it to disagree with some stomachs, and renders it an improper wine for gouty persons. *Port* is generally used in cases of pure debility, especially when attended with a loose state of the bowels, unaccompanied by inflammation. In such cases, it often acts as a powerful tonic as well as stimulant, giving increased activity to all the functions, especially digestion. *Claret* is much less heating, and is often useful on account of its aperient and diuretic qualities.

All the acid and acidulous wines are contra-indicated in the gouty and uric acid diathesis, as they are very apt to convert the existing predisposition into disease. They are useful, however, in what is called the phosphatic diathesis, their acidity tending to prevent the deposition of the earthy phosphates.

The quantity of wine which may be given with advantage in disease, is necessarily very variable. In low fevers, it may be administered to the extent of a bottle or more in twenty-four hours, either pure, or in the form of *wine-whey*. This is made by adding from a gill to half a pint of wine to a pint of boiling milk, straining without pressure to separate the curd which is formed, and sweetening the clear whey with loaf-sugar. Wine-whey forms a peculiarly safe and grateful stimulus in typhoid fevers and other febrile affections, which, after depletion, may tend to a state of deficient action and be accompanied with a dry skin. Under these circumstances, it often acts as a diaphoretic, and, if used of moderate strength, without stimulating the system in any marked degree.—*U. S. Disp.*

Wine is employed as a menstruum to extract the virtues of several plants, and the preparations thus formed are called *Vinous tinctures* or *Medicated wines*.

The chief medical use of *raisins* is to flavor demulcent beverages; taken in substance they are gently laxative, but are also flatulent and difficult of digestion, and when largely eaten sometimes produce unpleasant effects, especially in children. An excellent, pure, and sparkling wine may be made as follows: Take twelve pounds of good raisins, cut each raisin in two, and put them into a five gallon demijohn, nearly filled with clean soft water; let it stand uncorked for about fourteen days, then filter, bottle, and cork well. Upon the residue, after the wine is poured off, put as much water as before, let it stand a sufficient time, and the result will be a good white wine vinegar.

XANTHORRHIZA APIIFOLIA.

Yellowroot.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Pentandria Polygynia.

THE ROOT.

Description.—This is an indigenous shrub, two or three feet in height, with a thick horizontal root, throwing up numerous suckers. The stem is short, woody, leafy above, with a smooth bark, and bright yellow wood. The leaves, which stand thickly at the upper part of the stem, are pinnate, about eight inches long, including the long petioles, which embrace the stem at their base, glabrous, consisting of about three pairs of leaflets with an odd one; the leaflets are two or three inches long, ovate or rhomboidal, lanceolate, acute, sessile, incisely lobed and dentate. The flowers are small, dark-purple, and arranged in long, drooping, divided, and axillary racemes; they are also many, and appear with the leaves. The petals are obovate, two-lobed; the ovaries from five to nine. Follicles or capsules spreading, a line and a half long, inflated, compressed, one-celled, two-valved, opening at the apex; seeds oval, flattened.

History.—This is a native of the Southern States, being principally restricted to the mountains; it is likewise abundant in some of the Western States, and along the lower parts of the Ohio. It flowers in March and April. The root is the part directed to be used; it is from three inches to a foot in length, about half an inch in thickness, of a yellow color, and of a simple, but extremely bitter taste. It imparts its virtues to water, and the infusion is not affected by a solution of the sulphate of iron. The bark of the stem is equally as efficacious as the root. It was well known to the Indians on account of its tinctorial properties; it imparts a drab color to wool, and a rich yellow to silk, but is said to have no effect on cotton or linen. With Prussian blue it affords a dull olive green.

Properties and Uses.—Yellow root is a pure, bitter tonic; considered by the late Professor Barton to be superior to colombo. It may be used for all purposes in which the other simple tonic bitters are applicable. It may be given in decoction, tincture, or powder; two scruples of the powder agree well with the stomach. From the intensely bitter character of the resin, alcohol would appear to be the best menstruum.

XANTHOXYLUM FRAXINEUM.

Prickly Ash.

Nat. Ord.—Xanthoxylaceæ. *Sex. Syst.*—Dioecia Pentandria.

THE BARK AND BERRIES.

Description.—This shrub is the *Xanthoxylum Americanum* of Miller, the *X. Fraxinifolium* of Marshall, the *X. Ramiflorum* of Michaux, and

the *X. Tricarpum* of Hooker. It is known by the various names of *Northern Prickly Ash*, *Toothache-bush*, *Yellow-wood*, etc. It is an indigenous shrub, ten or twelve feet in height, with alternate *branches*, which are covered with strong, conical, brown *prickles*, with a broad base, scattered irregularly, though most frequently in pairs at the insertion of the young branches. The *leaves* are alternate and pinnate; the *leaflets* about five pairs with an odd one, nearly sessile, ovate, acute, with slight vesicular serratures, somewhat downy underneath. The *common petiole* is round, usually prickly on the back, and sometimes unarmed. The *flowers* are in small, dense, sessile umbels, near the origin of the young branches, they are small, greenish, dioecious or polygamous, appear before the leaves, and have a somewhat aromatic odor. In the *sterile* flower the *calyx* is five-leaved, with oblong, obtuse, erect segments, five *stamens* with subulate filaments, and sagittate, four-celled anthers; the ovary is abortive. In the *hermaphrodite* or *perfect* flower, the *calyx* and *stamens* are like the last, *ovaries* three or four, pedicelled, with erect, converging *styles* nearly as long as the stamens. The *fertile* or *female* flowers grow upon a separate tree, are apetalous, with a smaller and more compressed *calyx*, and five pedicelled *ovaries*, with *styles* converging into close contact at top, and a little twisted; *stigmas* obtuse. Each fruitful flower is followed by as many capsules as it had ovaries. The *capsules* are stipitate, oval, covered with excavated dots, varying from green to red, two valved, and one-seeded; *seeds* oval and blackish.

History.—The Prickly Ash is a native of North America, growing from Canada to Virginia, and West to the Mississippi, in woods, thickets, and moist shady places, and flowering in April and May before the appearance of the leaves. The whole plant is endowed with active qualities; the leaves and fruit abound in a fragrant, volatile oil, somewhat resembling in odor that of lemons; and the bark is acrid, pungent, and aromatic. Both the bark and fruit (berries) are officinal. As found in the shops, the bark is in quilled fragments, a line or two in thickness, with a grayish-white epidermis, which is frequently removed, internally of a whitish color, and somewhat shining; that from the small branches is beset with prickles. It is light, brittle, with a somewhat amylaceous fracture, and when dry nearly inodorous, having a taste at first sweetish and aromatic, but ultimately bitterish and acrid. It yields its properties to boiling water or alcohol. The fruit or berries as met with in the shops, consists of an open, bivalved, oval capsule, about three lines in length and two in diameter, brownish and covered with excavated dots externally, whitish-yellow, and smooth internally, and usually with a portion of the stalk appended; they inclose an oval, shining, black, wrinkled seed, which in the dried state is hollow, and grayish-yellow, or light brownish-yellow internally, inodorous, very brittle, and having the peculiar taste of the capsule in a very faint degree; this seed is more often absent than present in the capsule, from whose

opening it escapes, and may be generally found separated from it, but mixed up with the mass. The medicinal virtues of the fruit reside in the capsules, which have a faintly aromatic, peculiar odor, and a warm, pungent, peculiar, aromatic, and pleasant taste, both of which properties are more energetic in the recent than in the dried fruit. They depend upon a volatile oil for their properties, which they yield to alcohol or ether.

The bark has been analyzed by Dr. Staples, who found it to consist of a volatile oil, a greenish fixed oil, resin, gum, coloring matter, and a peculiar crystallizable principle which he calls *Xanthoxyline*, but the properties of which are not yet determined. Mr. W. S. Merrell has prepared an oil from the berries, which he calls *Oil of Xanthoxylum*; it is obtained by macerating the bruised berries in alcohol or ether, filtering, and evaporating. That made by the agency of alcohol is the most turbid and probably contains resin and extractive. It is of a dark-brown color, of a faint, peculiar odor, and of the taste peculiar to the berries in a high degree of concentration, being aromatic, and very warm and pungent. One pound of the berries yields about four fluidounces of the oil; and one fluidounce of this to thirty-two fluidounces of alcohol makes a good strong tincture, equal to one made by macerating two ounces of the berries in a pint of alcohol.

Mr. J. B. Robinson of this city has prepared an *ethereal oil* from Prickly Ash Bark; he makes a tincture with ether, filters, and then evaporates or distills off the ether. Four pounds of the bark thus treated yield one pound of oil. The oil made by Mr. Robinson is dark greenish-black in bulk, yellowish-green in thin layers, very fluid, possessing an odor of ether, and the peculiar taste of the bark in an eminent degree. It is soluble in alcohol, ether, and alkaline solutions, and will probably be found to possess the active principle of the bark in a concentrated form.

Properties and Uses.—Prickly Ash Bark is stimulant, tonic, alterative, and sialogogue. When swallowed, it produces a sense of heat in the stomach, with more or less arterial excitement, and a tendency to diaphoresis. It is used as a stimulant in languid states of the system, and as a sialogogue in paralysis of the tongue and mouth. It has proved highly beneficial in chronic rheumatism, colic, syphilis, hepatic derangements, and wherever a stimulating alterative treatment is required. Combined with equal parts of pulverized blueflag and mandrake, it will bring on salivation, and is useful on this account in the treatment of scrofulous, syphilitic and other diseases, where there is a want of susceptibility to the influence of other alterative agents; the mixture must be given in small doses, and repeated at short intervals. Externally, it forms an excellent stimulating application to indolent and malignant ulcers. Dose of the powder, from ten to thirty grains, three times a day.

Prickly Ash Berries are stimulant, carminative, and antispasmodic, acting especially on mucous tissues. Combined with pokeberries, in the

form of tincture, they are invaluable in chronic rheumatism, and tertiary syphilis. The tincture is also useful in all nervous diseases, spasms of the bowels, flatulency, and in diarrhea. In tympanitic distension of the bowels, during peritoneal inflammation, it is a safe and superior remedy, used internally and as an injection; half a fluidrachm to a fluidrachm, internally, every hour or two in sweetened water—and half a fluidounce of the tincture, with occasionally ten or twenty drops of laudanum added, according to the symptoms, given by enema every fifteen or thirty minutes. In Asiatic cholera, it was extensively used by the Eclectic physicians of Cincinnati, and with great success—it acted like electricity, so sudden was its influence over the system; indeed, many patients likened its action to an electric shock, which seemed to diffuse itself throughout the whole frame. We gave it in teaspoonful doses, slightly diluted, and repeated, according to circumstances, every five, ten or fifteen minutes, with an injection, prepared as above-mentioned, which was given immediately after each discharge from the bowels, and retained by the patient as long as possible. This is one of our most valuable agents. The dose of the tincture of the berries, as a carminative and antispasmodic, is from ten to thirty drops, three or four times a day. Used by some, during the intermissions, as a remedy in intermittent fever, which it is said to remove speedily. There is a material difference, in their influence on the system, between the tincture of the bark, or that of the berries, which should always be had in view. A patient with cholera came very near losing life, in consequence of using the tincture of the bark, instead of the berries, as prescribed; the druggist who filled the prescription supposed the properties of each were similar, and that they could be safely substituted the one for the other. The *oil of xanthoxylum* may be used for the same purposes as the berries, in doses of from two to ten drops in mucilage, or on sugar; and its tincture, made according to the formula above, may be administered in the same doses as the tincture of the berries.

The *Aralia Spinosa* is frequently but erroneously called by the name of Southern Prickly Ash; it differs from the *xanthoxylum* in its botanical character, as well as in its medicinal virtues. Mr. W. S. Merrell, has been for some time engaged in the investigation of the true character of these plants, and he informs me that he is confident that the agent which was employed during the cholera, and has been used since, as the *Aralia Spinosa*, is really a *Xanthoxylum*. It is to be regretted that so much confusion should exist in relation to the identity of some of our valuable agents, and which is principally owing to the similarity of vulgar names among different plants, and an inattention to their systematic names and characters. We hope that the above doubt may be satisfactorily solved by those having the proper opportunities to effect it.

Off. Prep.—Enema Xanthoxyli; Extractum Xanthoxyli Fluidum; Tinctura Laricis Composita; Tinctura Xanthoxyli.

XANTHOXYLIN.

Xanthoxylon.

THE OLEO-RESINOUS PRINCIPLE OF PRICKLY ASH BARK.

Preparation.—Prepare a saturated tincture of Prickly Ash Bark, filter, distil off the alcohol, and to the residue add water,—the oleo-resin precipitates to the bottom. After precipitation has ceased, collect the oleo-resin, and wash it in clear water; allow it to subside, and then separate it from the water.

History.—The profession are indebted to Mr. W. S. Merrell for the preparation of this valuable agent, which possesses all the medicinal properties of the bark in a concentrated form. When in mass it is blackish, but of a reddish-brown color in thin layers; it has a peculiar odor, somewhat similar to that of most oleo-resins, and a peculiar, bitterish taste, quickly succeeded by a persistent pungency in the mouth and fauces. It is insoluble in water; partially soluble in aqua ammonia and liquor potassa, forming a solution with a soapy feeling; soluble in ether, from which aqua ammonia removes a portion without much change of color; soluble in oil of turpentine, and to a greater or less extent in oil of savin, and some other essential oils; and soluble in alcohol, from which water precipitates it, forming a dirty-white solution. Acetic, nitric, sulphuric, and muriatic acids, when added to the alcoholic solution, occasion no precipitate.

Properties and Uses.—Xanthoxylon is stimulant, tonic, alterative and sialogogue, and may be used in all cases where it is desired to stimulate and strengthen mucous tissues. It forms an excellent remedy for rheumatism unaccompanied with inflammation, or where there is an asthenic condition of the system, and I have often used it for this purpose with cimicifugin, in doses of one grain of each, every one, two, or three hours, with much advantage. Combined with quinia, it will be found very beneficial in cases where quinia alone appears to exert no influence, and will prove a valuable agent in dyspepsia, accompanied with want of appetite, flatulence, and distress after eating, given in conjunction with ptelein. In low typhoid fever, Xanthoxylon will be found a valuable and permanent stimulating tonic, and may, when necessary, be added to laxatives, in that disease, to prevent too much prostration—it must, however, be employed only during the stage of prostration. It may be used alone as a stimulating tonic and alterative. Where a stimulating tonic is required for children after diarrhea, dysentery, or other debilitating diseases, a combination of hydrastin with xanthoxylon, will admirably fulfill the indication. In chronic rheumatism I have found the following preparation highly beneficial: Take of Cimicifugin, Xanthoxylon and Apocynin, of each one drachm, Proof Spirits or Whisky one pint; mix. Of this, the dose is a tablespoonful three times a day, or

sufficient to slightly affect the head, at the same time attending to the surface and excretory functions. Sometimes I add two drachms of guaiacum to the above. The dose of Xanthoxilin is from one to three grains, three or four times a day.

ZEA MAYS.

Indian Corn.

Nat. Ord.—Graminaceæ. *Sex. Syst.*—Monœcia Triandria.

THE FRUIT OR SEEDS.

Description.—Indian Corn is a monœcious paniceous grass, annual, with a fibrous *root*, and an erect, leafy *stem*, channeled on one side, and from five to ten, and in some varieties, from fifteen to twenty feet high. The *leaves* are lance-linear, entire, keeled, and two or three feet in length; *seeds* immersed in an oblong receptacle, mostly eight-rowed.

History.—This plant is a native of the warm latitudes of America, and its varieties are exceedingly numerous. Corn is universally cultivated in the United States, and also in the southern countries of Europe, and partially in Asia. In America, especially in the warmer portions, it forms the main article of food. It is extremely wholesome and nutritious, and is employed in a variety of forms; as it contains no gluten, the meal does not undergo the fermentation called “rising,” as with wheat, rye, etc. The young ears boiled, are in general a nutritious and digestible article of diet, but should be eaten with caution by those predisposed to, or suffering from disease of the bowels. According to Dr. Gorham, corn contains 77 per cent. of starch, 3 of a principle analogous to gluten, called *Zein*, 2.5 of albumen, 1.45 of sugar, 0.8 of extractive, 1.75 of gum, 1.5 of sulphate and phosphate of lime, 3 of lignin, and 9 of water. A yellow oil has likewise been procured from corn, which has been much used, instead of lard or fish oils, in lamps,—it consists of carbon 79.68, hydrogen 11.53, and oxygen 8.79.

Properties and Uses.—The meal is prepared into a gruel, which is sometimes more grateful to the sick than that made from oat-meal; in the form of mush it is an excellent and nutritious diet for patients during convalescence, and makes an excellent emollient poultice, for ulcers, swellings, rheumatic pains, etc. An infusion of parched corn is useful in allaying the nausea and vomiting attendant upon many diseases; it may be drank freely.

ZINCI SULPHAS.

Sulphate of Zinc.

Preparation.—Take of Zinc, in small pieces, four ounces, Sulphuric Acid six ounces, Distilled Water four pints. To the zinc and water,

previously introduced into a glass vessel, add by degrees the sulphuric acid, and, when the effervescence shall have ceased, filter the solution through paper; then boil it down till a pellicle begins to form, and set it aside to crystallize.

When Zinc is brought into contact with strong sulphuric acid, very little action ensues; but, when the acid is diluted, the water is decomposed, its hydrogen escaping with effervescence, and its oxygen combining with the zinc forming an oxide. This oxide is dissolved by the acid, forming a sulphate of the oxide of zinc, which may be obtained in fine, transparent colorless crystals by evaporation. The object in adding the sulphuric acid gradually, is to avoid the excessive effervescence which takes place when the materials are mixed at once. Impure Sulphate of Zinc, called *White Vitriol*, is prepared by roasting the native sulphuret of zinc, or Zinc-blende of mineralogists, in a reverberatory furnace, then exposing it to the air in a moist state until the sulphuret is converted by oxidation of its sulphur and metal into the sulphate; this is lixiviated, and the solution, concentrated by evaporation, is poured into molds, where it concretes into cakes like loaf-sugar. In this state it contains many impurities, as copper, lead, cadmium, and especially iron, in the form of sulphates; and from which it may be purified by dissolving the mass in water, and adding oxide of zinc to it, which precipitates the metallic bases, and unites with their sulphuric acid, forming sulphate of zinc. The solution may then be filtered, and crystallized by sufficient evaporation.

History.—Sulphate of Zinc is a colorless, transparent salt, having an intense, disagreeable, metallic, styptic taste, and crystallizing usually in small four-sided prisms. It effloresces on exposure to the air, is insoluble in alcohol, but soluble in two parts and a half of temperate water, and in considerably less boiling water. When heated, it first fuses in its water of crystallization, which is subsequently driven off; and at a still higher temperature, the anhydrous salt parts with a portion or the whole of its acid, and the oxide of zinc only remains. Its watery solution is precipitated white by the alkalies or their carbonates, oxide or carbonate of zinc being thrown down; and either precipitate is soluble in an excess of the alkali. Of course, if iron be present, which is generally the case, it is not redissolved. Ferrocyanate of potassium and hydro-sulphate of ammonia also occasion a white precipitate. Crystallized sulphate of zinc is composed of one equivalent of oxide of zinc 40.3, one of acid 40.1, and seven of water $63 = 143.4$. Its formula is $\text{Zn O} + \text{SO}_3 + 7\text{Aq}$. The commercial *White Vitriol* contains but three equivalents of water. Sulphate of Zinc is *incompatible* with alkalies and alkaline carbonates, hydro-sulphates, lime-water, and astringent vegetable infusions.

Properties and Uses.—By a certain class of practitioners, Sulphate of Zinc is used as a tonic, astringent, and emetic. As a tonic it has been

used in doses of a grain or two, in dyspepsia, obstinate intermittents, epilepsy, chorea, pertussis, debility attended with irritation, etc. As an astringent, its solution has been applied to bleeding surfaces, and chronic inflammation of mucous surfaces. As an emetic, the dose is from ten to thirty grains, and it usually produces vomiting very rapidly. In large doses it is an irritant poison, but seldom produces dangerous effects, as the patient is relieved by the vomiting which it occasions. This agent is never used internally by Eclectics, but is sometimes employed in solution, from one to six grains to an ounce of water, as a collyrium in chronic ophthalmia, as an injection in chronic gonorrhea, gleet, and leucorrhea, as a gargle in aphthous sore-throat, and relaxation of the uvula; and as a desiccative lotion in old ulcers with excessive discharges. It is also very much used as a local application to cancer, in which disease it has accomplished very beneficial results. Combined with powdered bloodroot, it has been successfully used in nasal polypi, and also in chancres. Prof. R. S. Newton has recently discovered it to possess antiseptic properties, and has extensively and successfully employed it in gangrene or mortification; as this is a matter of some moment to the profession, we extract from his remarks on the subject, as published in the *Eclectic Medical Journal*, May, 1849, Vol. I, No. 5, as follows:

“I am of the opinion, that as far as a constitutional treatment is indicated, it will be important to consider the nature of the complaint, and prescribe accordingly; but in reference to the local application, I think that one single remedy is sufficient to fulfill every indication, and that more dependence may be placed upon it, than upon any constitutional treatment, and there is no doubt but that the profession will willingly hail this discovery. My practice in this malady, has led me to step out of the old beaten track, in search of some agent that can be relied upon for its efficacy, its general application with safety in all cases, with but little modification, and one that will remove the necessity of so much attention to constitutional remedies, in many cases entirely.

This agent may also be used in the treatment of some varieties of erysipelas, which will be referred to hereafter. Sulphate of zinc is the article to which I wish to draw the attention of practitioners, as a remedy for mortification, and to show its beneficial results, by the description of a few cases treated by it. It may be argued, that the use of any remedy that will of itself produce active inflammation, could not be applied to a highly inflamed part, without producing fatal consequences, by increasing the disease beyond the reach of remedies. This will doubtless appear true to many, but experience has proved to the contrary, for it has been used in cases where the parts were in the highest state of inflammation, and although this was increased for a few hours by its action, yet in no case have I found it to produce any bad effect, or to so augment this condition, as to present any difficulty in the subsequent treatment. It will be remembered that all cases of mortification are

attended with a very offensive fetor, which is one of the characteristic symptoms of this disease, and which is caused by a decomposition of the healthy structure of the parts attacked, and this very cause produces the continuance of the disease, the changing of which is the indication to be fulfilled in every variety of treatment that has been adopted.

No agent will act so immediately in producing this change as the sulphate of zinc; the most extensively mortified surface, with the offensive fetor arising from it, can be stopped in a few hours after its application, and after one or two applications, the parts become hardened, and the fetor entirely removed. It fulfills two indications in this respect, viz.: arresting the decomposition going on in the parts, and correcting all unpleasant fetor which may exist; and it should be borne in mind, that as long as this fetor is present, the disease is not arrested. The following cases will be illustrative of the method of using it, in which I have found it useful.

CASE I.—Mr. F., aged 25, residing in Fulton, came to consult me in December, 1846, with an extensive mortification of the whole palatine arch and gums of the superior maxillary, succeeding a mercurial action which had been produced and continued a long time, and which had resisted the usual treatment for its arrest. I was induced to try the sulphate of zinc, and mixed a small quantity of it in fine powder, with a sufficient quantity of flour and water to make a paste; this, I spread upon soft leather, and applied over the parts affected, retaining it there until the paste sufficiently adhered, by a sponge placed upon the tongue. I would here remark, that this was a well-marked case. The fetor arising from the mouth, was such, that one could scarcely stay in the room with him. On the succeeding day, I found the fetor much diminished, and the parts secreting but little, with a portion entirely hardened. I made a second application, in a similar manner, and on the next morning the unpleasant fetor was entirely removed, and the whole of the diseased parts covered with a dry, hard surface, and no vestige of secretion from any part of it. I considered this to have been carried far enough, and made no further application of the zinc, but recommended the mucilage of ulmus and warm water to be used freely in the mouth, which was pursued for three days, when the entire portion upon which the zinc had been used, sloughed off, leaving a healthy appearance of the parts. It may be well to state here, that the entire structure of the arch, with a large portion of the bone, came away, after which it was treated as a common ulcer, and healed in about ten days, since which time he has remained in good health.

CASE II.—Mrs. S. was under treatment for a cancerous condition of the breast. It had ulcerated, and was attended with all the unpleasant symptoms of such a condition. I made use of caustic applications for its removal, but found upon the second day, that the whole gland was in a state of mortification, and that the system was fast failing from its

effect. I immediately applied the zinc, in the form of powder, covering the affected parts with it; in less than six hours a change of the fetid smell was very perceptible, but the inflammation continued without any abatement during twenty-four hours. On the next day I found that the remedy had dried and hardened a portion of the diseased surface; I, therefore, again applied it and covered the medicine with a poultice of elm bark, mixed with cold water; this dissolved the zinc in a few hours, and had the desired effect of changing and arresting any further extension of the mortification. In this case two applications were sufficient. It will be found, that in some cases, the zinc will produce a hardened surface, so as to prevent a sufficient quantity from acting throughout the diseased parts; this can be remedied by applying an elm poultice after the zinc is used, which will soften the surface enough to allow its full action, which is known, as before said, by absence of the fetor. All the dressing that is required, is the elm poultice, both before and after the use of the zinc; if the first application increases the inflammation to any extent, apply the elm for ten or fifteen hours, after which apply the zinc. The part will usually slough off in three or four days.

CASE III.—J. F., aged forty-eight, had an encephaloid tumor, situated on the leg, which required to be removed by an operation, previous to the application of medicine for its permanent cure. J. King, M. D., assisted me in removing the tumor, which had arrived at several inches in diameter. It was removed without any unnatural appearances attending the case. But on the second day, the whole incision, and for three inches around, became gangrenous, and accompanied with a high degree of inflammation. I immediately applied the zinc, and continued it for three days, when it became completely arrested, and in three days longer the diseased parts sloughed off, leaving a healthy condition of the remaining integuments, which were then treated without any further difficulty.

I have made use of this agent in forty-five cases, and in each it proved highly successful, so much so, that in only five cases was a slight constitutional treatment demanded. As these cases are all similar to those given, I deem it unnecessary to particularize any further. In four cases of ulcerated erysipelatous inflammation, I have used the zinc with similar success, though in these instances, it required a smaller quantity of the article, a greater number of applications, and at greater intervals between the applications. At some future time, I may again refer to this article, and its effects in other forms of disease."

Off. Prep. — Lotio Hydrastis Composita; Lotio Myrrhæ Composita; Lotio Sodii Composita; Lotio Zinci Composita; Unguentum Zinci Sulphatis; Unguentum Zinci Compositum.

ZINGIBER OFFICINALE.

Ginger.

Nat. Ord.—Zingiberaceæ. *Sex. Syst.*—Monandria Monogynia.

THE RHIZOMA.

Description.—The Ginger plant has a biennial, creeping, tuberous *root* or *rhizoma*; the *stems* are erect, oblique, round, solid, annual, invested by the smooth sheaths of the leaves, and two or three feet in height. The *leaves* are subsessile, on long sheaths, alternate, lanceolate, linear, acute, smooth above and nearly so beneath, bifarious, and five or six inches long by an inch broad; the *sheaths* are smooth, and crowned with a bifid ligula. The *scapes* are radical, solitary, a little removed from the stems, from six to twelve inches high, enveloped in a few obtuse sheaths, the uppermost of which end in tolerably long leaves, and terminate in oval, obtuse, bracteal, imbricated spikes, about the size of the thumb. The *exterior bracts* are imbricated, one-flowered, obovate, smooth, membranous at the edge, faintly striated lengthwise; the *interior* enveloping the ovary, calyx, and the greater part of the tube of the corolla. *Flowers* small, of a dingy-yellow color, and appear two or three at a time between the bracteal scales. The *calyx* is tubular, opening on one side, three-toothed; *corolla* with a double limb; outer of three, nearly equal, oblong segments; inner a three-lobed lip, of a dark purple color. *Sterile stamens* subulate; *filament* short. *Anther* oblong, double, crowned with a long, curved, tapering, grooved horn. *Ovary* oval, three-celled, with many ovules in each; *style* filiform; *stigma* funnel-shaped, ciliate, lodged just under the apex of the horn of the anther.

History.—Ginger is supposed to be a native of Hindostan, and is cultivated in the East and West Indies, and at Sierra Leone in Africa. The flowers and the stems when bruised, have an aromatic odor, but the root is the officinal part. In a young state these roots are preserved in sugar, forming a well known sweetmeat; when old, they are taken up, scalded in hot water, to prevent germination, and dried, constituting the black ginger of commerce; or if they are scraped previous to being dried, they form the white ginger. The roots are gathered in January and February, after the stems have withered. The East Indian variety is generally imported from Calcutta, while the West Indian is derived from the West Indies, usually by way of England. The *recent* root is from one to four inches long, somewhat flattened on its upper and under surface, knotty, obtusely and irregularly branched or lobed, externally of a light ash color, and marked with circular rugæ. Internally, fleshy and yellowish-white. The two varieties met with in commerce, are the *Jamaica* or *White Ginger*, and the *Common East India* or *Black Ginger*. The latter is most extensively used in this country. In shape it is the same as above described, but has a dark, ash-colored

epidermis, which being removed in some places, exhibits patches of an almost black color, apparently the result of exposure. Beneath the epidermis is a brownish, resinous, almost horny cortical portion. The interior parenchyma is whitish and somewhat farinaceous. The powder is of a light yellowish-brown color. The former differs in being deprived of epidermis, and white or yellowish-white on the outside. The pieces are rounder and thinner, firm and resinous, and possess more of the sensible qualities of ginger than the black variety. The powder is of a beautiful yellowish-white color. Ginger is of an aromatic and penetrating odor, with a pungent, hot, spicy and biting taste. It yields its virtues to water, proof spirit or rectified spirit. Age or long exposure diminishes its activity. Pieces which are very fibrous, light and friable, or worm eaten, should be rejected. Ginger consists of a greenish-blue volatile oil; a soft, acrid, aromatic resinous matter, soluble in ether or alcohol; a sub-resin insoluble in ether; osmazome; gum; starch; a vegeto-animal matter; sulphur; acetic acid; acetate of potassa; and lignin. The flavor of the root probably depends on the volatile oil, and its pungency on the resinous extractive.

Properties and Uses.—Ginger is stimulant, rubefacient, errhine, and sialogogue. When chewed it occasions an increased flow of saliva, and when swallowed it acts as a stimulating tonic, stomachic and carminative, increasing the secretion of gastric juice, exalting the excitability of the alimentary muscular system, and dispelling gases accumulated in the stomach and bowels. It is much used to disguise other drugs, concealing their nausea, or preventing their tendency to cause tormina. When snuffed into the nostrils it causes violent sneezing. It has been used in combination with astringents or other agents, in diarrhea and dysentery; prepared with rhubarb, in the form of cordial or syrup, few articles are more valuable in cholera morbus, and cholera infantum. It is eminently adapted to flatulent habits, dyspepsia, hysteria, and the feeble state of the alimentary canal attendant upon atonic gout; and is excellent to relieve nausea, pains and cramps in the stomach and bowels, and to obviate tenesmus. Combined with black willow bark, it forms an excellent poultice for indolent ulcers; and is sometimes employed as a local remedy in relaxation of the uvula, and paralysis of the tongue. Dose of the powder, from ten to thirty grains; of the infusion, prepared by adding half an ounce of the powdered or bruised root to a pint of boiling water, one or two fluidounces. A large quantity of ginger taken internally might produce serious effects.

Off. Prep.—*Acidum Sulphuricum Aromaticum*; *Infusum Zingiberis*; *Pulvis Asclepiæ Compositus*; *Pulvis Jalapæ Compositus*; *Syrupus Zingiberis*; *Tinctura Zingiberis*.

PART III.

P H A R M A C Y .

COLLECTION AND PRESERVATION OF PLANTS.

It is of vital importance to the practitioner that the agents which he employs in practice be as perfect in their character as circumstances will admit; for, no matter how excellent a remedy may be when properly prepared, an inattention to the requisites demanded for their purity and excellence may prove very serious in its results. The custom pursued by some apothecaries of retaining on hand an old and inert stock of medicine, and palming it off upon the physician or his patient as genuine, is very reprehensible, and cannot be too severely discountenanced, and we are glad that this practice is confined to but very few. It is the positive duty of the apothecary to furnish himself with good articles of medicine, to take especial care in preserving them, that they do not become soiled or otherwise injured, to prepare them, when called for, in a neat, scientific, and expeditious method, and to dispense them strictly according to the physician's prescription, without using his own judgment in the matter, or substituting other agents for those which may not be in his store, because, it is not to be expected that he should know the indications which the practitioner desires to fulfill, nor the especial object in view which originated the prescription. One exception, perhaps, may be made, in which the agents are of a deleterious or poisonous character, when, should the apothecary consider, from the largeness of the article, or its dose, if that can be ascertained, that a mistake or oversight may have occurred, it is then his duty, not to alter or modify the prescription, but to send it back to the physician, or present it himself in person, that it may be examined and corrected. As by far the greater number of agents used in Eclectic practice are derived from the vegetable kingdom, an attention to the following observations will, as a general rule, insure pure and active medicines.

All medicinal plants, with but a few exceptions, have their active qualities more or less impaired by long keeping; hence, the pharmacist should, as a general rule, reject the supply of the previous year, and provide himself with fresh agents; with our indigenous remedies this is more especially necessary, as these can be, and should be, freshly collected every year. Plants should be gathered at a proper period, according to the portion designed for use, and which is generally recognized as being at the time when the natural juices of such part exist in it more abundantly. Great attention should be bestowed upon this matter; as the reputation of an agent depends entirely upon its careful collection and preservation; thus many of our most active agents possess but little medicinal powers when young, and are at this early period often eaten with impunity as greens, among which may be named the young shoots of poke, asclepias, dandelion, etc. Soil, climate, and cultivation exert a remarkable influence on the properties of plants, and, with the exception of the Labiatae, whose aroma becomes much improved by cultivation, nearly all other plants become deteriorated and useless as medicines when reared under the hand of the cultivator. Plants found in their places of natural growth present the greatest degree of medicinal activity, consequently, it is recommended to collect these and no others. Most of the Umbelliferae growing in a dry soil are aromatic, while those peculiar to wet places are narcotic and poisonous. The Cruciferae thrive best in damp localities, while the Labiatae found in dry soils are to be preferred. The attention of the herb-collector should always be directed to these several points.

Roots.—Roots must be collected according to the character of the plant; thus an *annual* plant will yield the most actively medical root, just previous to the flowering season; though the generality of this class of roots are erroneously gathered after the flowering period, and consequently are less active and do not retain their qualities for any reliable time. The roots of *biennial* plants are most energetic if collected after the vegetation of the first year has ceased, or on the disappearance of the first year's leaves. The roots of *perennial* plants are best collected in the winter or early in the spring, previous to vegetation. *Bulbs* should be collected when the new bulb is perfected, but not yet vegetated, or about the time the leaves decay.

Stems.—Herbaceous stems are best gathered after the appearance of the leaves, but before the time of flowering. Ligneous or woody stems during the winter, as then the wood contains more extract.

Barks.—Barks from the root, body, or stems, should be collected when they can be most easily separated from the wood, and which is generally either previous to the appearance of the flowers, or in the autumn, after the termination of the reproductive process. Too much care cannot be displayed in selecting barks; those which are very young,

or somewhat old, and especially decayed portions, should be at once rejected.

Leaves.—Leaves should be collected after their full development, before the fading of the flowers, or previous to the ripening of the fruit or seeds. It must be remembered that the leaves of biennial plants, are not in full perfection until the second year; consequently, they should be gathered only at this period.

Flowers.—Flowers must be gathered either before or immediately after they have fully expanded, and some while yet in the bulb. *Aromatic herbs* are best when gathered during the season of flowering. *Stalks* and twigs should be collected in autumn; and *seeds* as soon as they have fully ripened. *Berries* and *succulent fruits* generally, are to be collected only when ripe.

Drying of Plants.—This is a very important process in the preservation of medicinal plants, as the activity of an agent depends, probably, as much upon the method adopted in drying it, as upon its inherent qualities. Many remedies are often injured or rendered inert by an improper or careless mode of drying. Leaves, herbs, and flowers, should always be gathered in dry weather; in the morning after the evaporation of the dew is the best period. Much care is necessary, not only in drying roots, but the other parts of plants; in general, they should be dried in a well ventilated room, and with as much rapidity as may be necessary for their proper preservation; and during damp weather, it will be advantageous to heat the room artificially by means of a small stove, or drum, allowing the temperature to range between 70° and 100° F. The articles to be dried should be so arranged that the currents of air may pass over and through them, and they should be frequently stirred. Roots should be washed, and the fibers, if not used, separated; then, especially if large and succulent, cut into transverse pieces, from one-fourth to half an inch in length, and dried in the sun, or in the drying room at 100° F.; in order to prevent molding, they should be frequently turned. *Fibrous roots* may likewise be dried in the sun, or in a temperature not to exceed 85°. *Bulbs* may be dried similarly, after first having had the outer membranes removed.

Barks, stems, woods, and twigs, during the process of drying, may be arranged in thin layers, or hung up in small, loose bundles, and dried in the open air. *Leaves* are to be dried in a manner which will preserve their natural color; they should be freed from the stalks, and as much as possible from external moisture, then laid in thin layers, and loosely strewed in a dark room, the temperature of which must not be less than 130° or 140° F. and in which they must remain for three or four hours, or until they begin to shrivel. They should then be turned, in the same temperature, which should be maintained for six or eight hours longer; when the operation is finished, which may be known by the leaves readily

crumbling in the hand. Leaves thus dried retain their color and medical properties in a high degree, and should be kept in well-stopped vessels, and carefully excluded from light and moisture. The usual method of drying leaves is to strip them from the stem, lay them loosely on the floor of a dark room, and turn them several times; and when dried, press them in packages. The custom of moistening or steaming leaves and other preparations previous to packing them in bundles, for the purpose of causing them to pack more solidly, and which is pursued by many collectors of medicinal plants, is exceedingly improper. The articles become very much deteriorated in quality thereby, and soon mold. *Flowers* are frequently very difficult to dry, so as to retain both their odor and color. They should be dried rapidly, in the manner recommended for the drying of leaves; and as soon as thoroughly dried should be firmly compressed into packages, and kept in dry situations. Some flowers cannot be completely dried, without destroying their active properties at the same time; these may be kept loosely in proper jars. *Berries* and *succulent fruits* may be suspended in bunches and dried, or removed from the branches and spread in thin layers on a wicker frame in a dry and darkened room; they should be frequently stirred during the drying process. *Seeds* may be dried, when this is necessary, by spreading them out thinly, and drying in a dark room. *Aromatic herbs*, and *annual plants* generally, when not too juicy, may be tied in small bundles, and suspended on lines stretched across the drying-room.

In the drying of plants, there is considerable loss of water, and some of the volatile constituents. The Edinburgh Dispensatory gives the following table, as showing the amounts obtained from 1000 parts of the respective articles named, after having been dried:

Roots of Angelica Arch'l.....	263	Twigs of Sola. Dulcamara.....	308
Aspi'm Filix Mas.....	500	Leaves of Atro. Belladon.....	140
Inula Helenium.....	187	Conii Maculatum.....	185
Valeriana sylves.....	316	Datura Stramon'm.....	110
Bark of the Oak.....	410	Leaves of Digitalis purpur.....	180
Elder.....	292	Hyoseyamus niger.....	135
Elm.....	375	Melissa officinalis.....	220
Leaves of Salvia officinalis.....	220	Flowers of Lavandula vera.....	510
Tops of Mentha piperita.....	215	Sambucus Ebulus.....	256
Flowers of Anth's nobilis.....	338	Petals of Papaver Rhœas.....	84
Borago officinalis.....	96	Rosa rubra.....	330

In relation to the preservation of medicines, which is of much importance to apothecaries, the following rules have been recommended. The store-room should be quite dry, exempt from vermin, and capable of being ventilated when desired. Drugs should not be put away until thoroughly dried, and should be kept from the light, and on the addition of new parcels to the old, the latter should be examined, and freed from all impurities. *Roots, barks* and *woods* may be kept in barrels or boxes, with well fitted covers, and other drugs can be well kept in tin canisters,

or in glass or earthenware vessels. All medicines should be frequently inspected, particularly in warm weather, to prevent injury from insects or dampness, and when the former are discovered, they may be destroyed by suspending an open vial containing chloroform in the canister or vessel holding them, which is to be securely closed, and thus saturate the atmosphere of the vessel with its vapor. *Oils, fixed or volatile*, are best kept in a dark place, and in a temperature ranging from 60° to 65° F. Care should always be taken to separate the various drugs from admixtures, inert substances and dirt, and the finest quality should always be preserved separate from that of the second.

Aromatic leaves, flowers, and pulverized drugs should be kept in tin vessels, or glass jars, and excluded from the light as much as possible, as the action of light upon them impairs their activity. All parts of plants requiring to be kept fresh for as long a time as possible, should be buried in dry sand, especially roots, bulbs, and succulent fruits.

WEIGHTS AND MEASURES.

In this country the apothecary makes use of the Avoirdupois weight in buying and selling medicines, but employs the Troy measure of weight in compounding and dispensing them, which is divided for the convenience of the apothecary, into grains, scruples, and drachms; thus, twenty grains being equal to one scruple; three scruples to one drachm; eight drachms to one ounce; and twelve ounces to one pound; this measure is frequently termed "apothecaries weight." The fluid measures recognized are the wine gallon and pint. Other measures of an approximative character are also employed in dispensing medicines, as the wineglass, tablespoonful, dessert-spoonful, tea-spoonful, and drops. (See Weights and Measures in the Appendix.) For the measurement of liquids, graduated glass measures, varying from four to sixteen ounces, are made use of, in which any quantity not less than one fluidrachm may be proportioned; and for obtaining fractions of a fluidrachm, the minimeter, graduated into sixty parts or minims is a very convenient instrument. The mode pursued by many apothecaries, of dropping liquids from the lip of the bottle, is very inaccurate and objectionable, from the fact, that the drops of various liquids vary considerably in size, and even those of the same liquid vary considerably, according to the size of the vessel from which they are dropped, as the following results of Mr. Alsop's investigations verify.

	When dropped from a Large Bottle.	When dropped from a Small Bottle.
One fluidrachm of Diluted sulphuric acid, yielded	24 drops,	84 drops.
" of Scheele's hydrocy. acid, "	35 "	70 "
" of Distilled water, "	31 "	54 "
" of Solution of Ammonia, "	40 "	48 "
" of Tincture of Opium, "	84 "	135 "
" of Rectified Spirit, "	100 "	130 "
" of Tinc. of Muriate of Iron, "	100 "	150 "

From this table will be seen the disadvantages of measuring medicines by drops. To obviate the difficulty heretofore experienced in measuring fractions of a fluidrachm, Mr. Alsop has invented a minimeter, which is probably the most convenient and accurate instrument for such purposes; it consists of a very slender glass syringe, graduated into sixty parts, each being equal to a minim.

DETERMINATION OF SPECIFIC GRAVITIES.

• It is often a matter of importance to the apothecary to determine the specific gravity of an article, in order to test its purity. The instrument generally used for this purpose, when applied to liquids, is Baumé's hydrometer. It consists of a glass bulb, properly loaded at one end, drawn out at the other into a tube, on which the scale is accurately marked. In order that this instrument may be used in small vessels, it should have a very short tube, and especially when intended for syrups, be graduated from 20° to 40° of Baumé's scale for heavy liquids. The specific gravities of syrups, acids, and saline solutions are usually ascertained by hydrometers. When used for alcohol, the instrument is graduated by loading it until it sinks to the foot of the stem (which is marked zero) in a solution of nine parts of water to one of common salt. It is then placed into water, and the place to which it sinks marked 10° of the scale, which is constructed from these data. For liquids heavier than water, the instrument is loaded until it sinks, when in distilled water, nearly to the top of the stem, which is the zero of the scale. It is then placed in a solution of fifteen parts of salt in eighty-five parts of water, and the place to which it sinks marked 15°, and the scale properly divided off into fifteen equal divisions or degrees, and as many more degrees added as the length of the stem will admit of.

Other means are sometimes employed. Thus, a bottle which will hold exactly a thousand grains of water, at 60°, will give the specific gravity of any liquid which it will hold, by the weight in grains of that quantity of the liquid. Such bottles, made very accurately, can be had in the shops. Or an ordinary vial may be employed, and the weight of the liquid examined, being divided by the weight of the water, will give its specific gravity.

The centesimal alcoholmeter of Gay Lussac will indicate the percentage of absolute alcohol in any mixture of pure spirit and water.

There are several other hydrometers in use, as *Fahrenheit's*, *Nicholson's*, which is also applicable for taking the specific gravities of solid substances, *Cartiers'*, for liquids lighter than water, *Twaddle's*, *Zanetti's*, *Sike's*, and various others. Also hydrometers for determining the density of syrups called *Saccharometers*; the purity of oil, called *Elaëometers*; the density of urine, called *Urinometers*, and for ascertaining the quality of milk, called *Galactometers*.

To obtain the specific gravity of a solid, it must be first weighed in air and then in water, and the difference between the two divided into the former weight. If the body be lighter than water, after first weighing it in the air, weigh it again in air and water, in connection with a heavier body, which last has been previously weighed in air and in water. The weight of the lighter body in the air should be divided by the excess of the difference between the weights in air and water of the two conjoined, over that of the weights in air and water of the heavier body alone. If the body be soluble in water, its relative weight to that of some other liquid of known specific gravity should be ascertained in the manner above directed, and its weight multiplied by the specific gravity of the liquid.

PULVERIZATION OF MEDICINES.

In order to reduce medicinal agents to a state of minute division, or to more readily extract their virtues, various processes are employed, as slicing, bruising, rasping, filing, trituration, grinding, sifting, levigation, and elutriation. The most important drugs are, however, purchased already pulverized, thus saving the apothecary considerable time and labor; yet as much fraud is perpetrated in this department of medicinal preparations, too much care cannot be observed that they are obtained from honest individuals. As it is often necessary, however, to pulverize small quantities of medicines not usually kept in the form of powder, the apothecary should be provided with iron, brass, and Wedgewood mortars, also of glass and marble, several sieves of various degrees of fineness, a hand-mill, cutting-knives, rasp, and a pair of pruning-shears.

Pulverization is, under the above-named circumstances, usually performed in an iron or brass mortar, with the pestle suspended on a spring so as to assist in elevating it; and to prevent loss, the mortar is covered with a piece of leather, firmly attached to its outer edge, and through the center of which the pestle passes, having the leather fastened to it at that place. The operator should be careful not to introduce too great a quantity of the article at a time, and should also guard himself against the powder or vapor of acrid substances, by covering his mouth and nostrils with a wet cloth, or otherwise. After *contusion* has been carried on for some time, the finer particles should be separated by the sieve, while the coarser particles are to be returned to the mortar for further bruising, and this course must be pursued alternately from time to time, until complete pulverization is effected.

For the coarse division of drugs, the hand-mill may be employed; Swift's drug-mill is probably the best of the kind; and in using it for fibrous roots or barks, as elm bark or sarsaparilla, they should be sliced transversely, in short sections.

Trituration is most generally applied to friable and other substances, where it is desirable to bring them to a uniform state of division, and is

accomplished by a circular motion being given to the pestle, accompanied with more or less pressure, the circular movement being so made as to bring the pestle alternately in contact with all portions of the surface of the mortar. For this purpose, the glass or Wedgewood mortar is usually selected.

Levigation is the same as trituration in its principles, the difference consisting in its being effected between the flat surfaces of a slab and muller, which are usually made of glass, porphyry, marble, or Wedgewood ware; it divides the particles of a substance more uniformly, than the trituration carried on between the curved surfaces of a mortar and pestle. The powder is generally brought into a pasty consistence by means of water, alcohol, or some other fluid in which it is insoluble.

Elutriation consists in agitating a powder obtained either by trituration or levigation, in a large quantity of water, allowing the coarser particles to subside, and pouring off the supernatant fluid, holding the finer particles in suspension, that they may settle separately. The pasty thick mass, which is left when the clear liquid is decanted, is then put into a funnel, and dropped in small portions on a chalkstone so as to form small conical masses.

In all cases, in order to facilitate the operation of pulverization, all parts of vegetables must be thoroughly dried, especially those containing volatile principles, and resins, gums, and gum-resins must be powdered in cold frosty weather; tragacanth and nux vomica must be dried in a stove and powdered while hot. The efflorescent salts may be obtained in fine powder, by exsiccation; and those which are insoluble in alcohol, may be precipitated from their aqueous solutions, in an impalpable powder, by this liquid. Insoluble substances are best reduced to powder by levigation. Squill and colocynth are best powdered in a dry atmosphere, after being thoroughly dried by a stove-heat. Cloves, capsicum pods, cantharides, and the aromatic seeds may be ground in a hand-mill, and afterward triturated. Fibrous roots should always be cut into transverse slices previous to powdering. Magnesia, white lead, and agaric may be reduced to powder by gently rubbing through a fine wire-sieve; or agaric may be beaten into a paste with water, then dried and triturated. Some agents require the aid of an intermedium before they can be reduced to powder; thus, camphor and the hard compound extract of colocynth require the addition of a few drops of alcohol; vanilla, gold-leaf, mace, and oily aromatic substances require the addition of sugar before they can be powdered; phosphorus may be powdered by means of lime-water and heat, and the mixture is to be stirred up till it cools. Some articles are prepared for pharmaceutical purposes by filing and rasping, as horn, ivory, nux vomica, iron, etc.; some by turning in a lathe, as quassia, guaiacum-wood, iron-wood, etc.; some by cutting with large shears or a cutting instrument, as herbs, some roots, stalks, etc.; and tin or zinc are granulated by melting them and pouring

them into a mortar, heated a little above their melting point, and agitating them rapidly as they cool. In all pharmaceutical preparations, the inert portions of the substances entering into them should be rejected, as the dead epidermis of various barks, inert central woody portions of various roots and stems, etc.

SEPARATION OF MIXED SUBSTANCES.

Solids are separated from liquids in which they are insoluble, or in which they are not acted upon chemically, by being allowed to subside, and then carefully pouring off or *decanting* the supernatant liquid,—or a syphon may be used to drain it off, or it may be filtered. Decanting or precipitating jars are larger at the bottom than at the top, and are furnished with a lip for pouring; the process of decantation may be facilitated by holding a glass rod in a slightly inclined vertical position, one end of which is placed in the receiving vessel; the lip of the decanting jar is brought nearly or quite in contact with the upper part of this rod and the liquid poured upon it. The glass rod attracts and gives a direction to the current, and prevents any of the fluid from running down the sides of the vessel. If the circumference of the vessel be so large as to render it impossible to pour with the guiding rod, which is very apt to be the case if its sides be perpendicular, with no lip present, and the fluid contained nearly filling it,—a little grease rubbed over the part of the vessel at which it is designed for the liquid to flow, will by preventing any adhesion of it to the surface of the vessel at that point, cause it to flow in a more cylindrical stream, and with less liability of overrunning the sides of the vessel.

Cases, however, occur where, from the character of the fluid, the shape or size of the vessel containing it, or from the disturbance occasioned to the precipitate upon motion, decantation is difficult or impossible; in such cases the syphon will effect the separation. The syphon is a bent tube somewhat resembling the letter U, having one leg shorter than the other. By filling it with fluid, and placing the short leg into the fluid to be drawn off, a current is established toward the longer limb, owing to the greater weight of its contents, and all the fluid may be removed as long as the short limb is kept below its surface.

Pipettes are instruments used for removing small quantities of liquids from the surface of precipitates or from places from which it would be difficult otherwise to remove them. A pipette is a slender glass tube with one end drawn to a very small point and capillary orifice, and at an inch or so from which a bulb is blown. The instrument may be straight, or it may be bent above the bulb at an oblique angle. To remove the liquid the small point of the instrument is carefully placed in contact with it, while with the mouth, or which is better, by means of a syringe attached to the upper part of the instrument, suction is made and

continued until the bulb is filled—this is then removed, and the process is to be continued until all the liquid has been removed.

When it is desired to separate liquids which are immiscible with each other, as oils and water, ether and water, etc., *separating funnels* or *separators* are employed, of which there are three or four varieties.

Filtration is the pouring a mixture on a porous surface, called a filter or strainer, through which the fluid only can pass, and which separates the solid from the fluid, presenting the latter in a clear form. Filters are generally made of unsized paper, cotton, linen, woollen cloth, charcoal, glass and sand. Tinctures are usually filtered through paper; syrups through flannel; acids through siliceous sand; oils, syrups, and oxymels through coarse paper, or muslin; melted fats, resins or wax, and plasters through muslin, hair cloth, or wire gauze. Liquids which are affected by exposure to the atmosphere, or which evaporate readily should have the filter in which they are placed covered with a sheet of tin foil or plate of glass luted, with a small hole in the cover, or a small tube may be placed within and against the side of the funnel, extending nearly to the top, so as to form a communication between the atmosphere of the receptacle and that of the funnel.

Expression is usually accomplished by screw-presses, for the purpose of separating the last portions of tinctures, infusions, etc., from the dregs. Fresh plants require to be well beaten, before being pressed, water being added to those which are hard and dry. Succulent fruits may be placed in strong flannel bags, filling about two-thirds, and the juices expressed. Seeds containing oil are to be first bruised, put in strong bags, and then subjected to strong, sudden pressure. Cylinders of strong sheet tin, having the sides pierced with small holes, are usually employed to contain the substance to be pressed; a block of wood which fits the cylinder, like a piston, being placed upon the substance, and gradually brought to bear upon it, by means of the screw-press. The liquid flows through the small holes, and is received into a tray of tin placed below on the lower platform of the press, and from which it is passed into other vessels.

Clarification of liquids may nearly always be accomplished, by beating the white of an egg with water, adding it to the liquid, and then coagulating with a gentle heat. Expressed oils are clarified from mucilage by boiling them with water. The expressed juices of many plants may be clarified by the vegetable acids.

FLUID PREPARATIONS.

The active principles of vegetables are obtained by infusion, maceration, digestion, decoction, lixiviation, or by displacement.

Infusion is the subjecting a substance containing soluble principles, to the action of some menstruum, as alcohol, etc., but most usually water.

Hot infusions are made by pouring boiling water on the substance, covering it, and allowing it to remain till cold. Cold infusions are made with cold water, and require more or less time to attain their full strength, according to the ready solubility of the active principle. When liquids are allowed to act upon medicines for some time, at a temperature ranging from 60° to 90° , it is termed *maceration*; if the temperature be higher, but below the boiling point of the liquid, it is termed *digestion*. *Decoction* is, when the article has been boiled for a longer or a shorter time, according to the readiness with which its virtues are extracted. The employment of either of these processes depends entirely upon the character of the article to be extracted; thus, many plants are injured by long boiling, others require it—some yield their properties to cold, others to hot water; and volatile principles are easily dissipated by boiling.

Lixiviation is a process used to separate a *soluble* from a porous *insoluble* body; as for instance, the procuring lye, by lixiviating wood ashes. The *method of displacement*, or *percolation*, is an improvement upon this process. It consists in reducing the article to be acted upon to a proper degree of fineness, then soaking it for a few hours with a sufficiency of the spirit to make it into a stiff pulp; it is then to be packed in a cylinder with the requisite degree of pressure, which can only be learned from experience, and the alcohol or spirit poured over it. The cylinder may be made of tin, twelve inches in length, two and a half inches in diameter, or fourteen by four, or seventeen by six; the lower part of this cylinder is made funnel-fashion, to the base of which a metallic plate pierced with holes is accurately fitted, and which, when in operation, should have a thin stratum of carded cotton laid over it, previous to placing in the powder.

The solution which first passes through is always in a state of high concentration, and should be set aside. The others are weaker, and may be evaporated to the proper strength, or mixed with the first portion, as required. The United States Pharmacopœia gives the following directions for this process:

“The kind of filtration commonly designated as the *Process of Displacement*, which is employed in many of the processes of this Pharmacopœia, is to be effected in the following manner, unless otherwise specially directed: A hollow cylindrical instrument, called a *percolator*, is to be used, somewhat conical toward the inferior extremity, having a funnel-shaped termination, so as to admit of being inserted into the mouth of a bottle, and provided internally, near the lower end, with a transverse partition or diaphragm, pierced with numerous minute holes, or, in the absence of such a partition, obstructed with some insoluble inert substance, in such a manner that a liquid poured into it may percolate slowly. The substance to be acted upon having been reduced to a coarse powder and mixed with enough of the menstruum to moisten

it thoroughly, is, after a maceration of some hours, to be introduced into the instrument, and slightly compressed upon the diaphragm. Any portion of the macerating liquid which may not have been absorbed by the powder, is afterward to be poured upon the mass in the instrument, and allowed to percolate. Sufficient of the menstruum is then to be gradually added to drive before it, or displace the liquid contained in the mass; the portion introduced is in like manner to be displaced by another portion; and so on till the required quantity of filtered liquor is obtained. If the liquor which first passes should be turbid, it is to be again introduced into the instrument. Care must be taken that the powder be not, on the one hand, too coarse or loosely pressed, lest it should allow the liquid to pass too quickly, nor, on the other hand, too fine or compact, lest it should offer an unnecessary resistance. Should the liquor flow too rapidly, it is to be returned to the instrument, which is then to be closed beneath for a time, in order that the finer parts of the powder may subside, and thus cause a slower percolation."

(For further and more detailed accounts of the various manipulations required in Pharmacy, the reader is referred to "*Mohr and Redwood's Practical Pharmacy*, by Wm. Procter, Jr., a very valuable work which should be in the possession of every physician and druggist in the country.)

DISPENSING OF MEDICINES.

The dispensing of medicines from the counter, in which they are extemporaneously combined and prepared in divers modes, constitutes a major portion of the apothecary's duties; and to perform it correctly, neatly and expeditiously, requires a thorough knowledge of his profession, united with a quick perception, accurate judgment, physical agility, and an expertness at manipulating. In connection with these, cleanliness and urbanity are indispensable requisites. The apothecary who attends to the dispensing of medicines should never be found doing so in his shirt-sleeves; there is not a shadow of excuse for it, and no matter how warm the weather may be, a thin light coat should always be worn. Some apothecaries I have seen who lick the mouths of their bottles, after having poured the required quantities of fluid from them, or who, in helping themselves to syrups or other preparations kept in bottles, apply the mouth of the bottle to their own mouth, instead of pouring it into some proper vessel from which they could drink it; these are very disgusting habits, of which no properly bred person would be guilty, and which alone should be sufficient cause for a withdrawal of all public patronage. And if these are valid reasons for bestowing custom upon some more cleanly dispenser of medicines, what can be said of those individuals who scratch their heads, and blow their noses with their fingers, not only while in the act of preparing medicines, but even

in sight of their patrons? A man of coarse mind, possessing none of the polish of refinement, and having no regard or care for the views or sentiments of others relative to the above points, is no more fit to dispense medicines than the most ignorant boor. Medicines are, in general, sufficiently repulsive, without having extra-aversion added to them through disgusting and uncleanly habits, and the apothecary should so observe and regulate his actions as to win the confidence of the most fastidious individuals. A neat, cleanly and orderly store, a polite, attentive, and cleanly apothecary or clerk, devoid of all offensive habits whatever, together with accuracy, neatness and dispatch in filling prescriptions, will always command the confidence and patronage of physicians, as well as patients.

In Eclectic practice, decoctions and infusions are seldom ordered in prescriptions; but where they do occur, the *infusion mug* of Mr. Alsop of London, will be found one of the best instruments for facilitating the process. If an infusion or decoction be strained *while hot*, and bottles heated previously in order to prevent their cracking, be filled with it, it may be kept for some months, even in hot weather, provided the bottles be so stopped with accurately ground stoppers, as to have the stopper displace its own bulk of the liquid. The hotter the liquid, and the freer from air-bubbles, the longer will the infusion be preserved. Cork stoppers may answer the same purpose, provided the orifice in the neck of the bottle be instantly closed, and the cork covered with sealing wax.

Aromatic waters may be made extemporaneously, by rubbing together two drops of any essential oil with five or six grains of carbonate of magnesia for every fluidounce of water, adding the water gradually while rubbing, and then filtering. Water may likewise be saturated with camphor, by triturating the gum with carbonate of magnesia first, and then gradually adding the water. The oils, solid fats, and gum-resins triturated with camphor, render it miscible with water; one-fifth of gum-myrrh will render a large proportion of the camphor miscible with water. Camphor softens the gum-resins. In the preparation of emulsions, the gum-resins should be triturated until all the particles are softened, and then strained. Ether becomes more soluble in water by trituration with spermaceti, separating the excess of spermaceti by filtration. Elaterium may be thoroughly incorporated with other articles, by rubbing it at first with a little alcohol, and then with sugar or syrup. A little olive oil added to a few drops of croton oil, ordered in a mixture, will render the mixture more permanent.

All vessels used by the apothecary should be cleansed immediately after using them, wiping them perfectly dry. Fatty substances and resins may be removed by pearlashes or other alkali, or alcohol; prussiate of iron by pearlash; metallic substances by nitric or muriatic acids; the odor of essential oils, musk, etc., may be removed by bruised peach-kernels, or peach-leaves, or other articles containing hydrocyanic acid—

in all cases having first removed fats, if present, by some alkaline solution, and resins by alcohol. The dispensing scales should be kept constantly clean, and in some place not exposed to the dust, as for instance, in a glass case, and they should be frequently examined to ascertain whether they continue properly adjusted. Scales adjusted to weighing grains and parts of an ounce, are easily rendered inaccurate by being placed in situations where they are exposed to much jarring, or frequent unnecessary handling; the apothecary will do well to observe this statement, and act in accordance with it.

In some parts of this country, it is not uncommon for the dispensing office to contain one or more idlers or loungers, during a portion of every day, who, from their continual staring at lady-customers, as well as their tobacco-spitting and smoking, drive the respectable portion of patrons to other shops; these are more generally the associates of the assistants or clerks, who, without intending offense frequently offend very seriously. A proper course should be adopted in relation to this class of visitors.

COMPOSITION OF VEGETABLES, AND THEIR PROXIMATE PRINCIPLES AND PROGRESS IN PHARMACY.

BY W. S. MERRELL, A. M.

The Vegetable Kingdom is the great source from which all animal life derives its nutriment in health, and for the most part its medicine in disease. All vegetable matter is composed of a very few *elementary substances*—carbon, hydrogen, oxygen, and nitrogen, constitute nineteen-twentieths of all the innumerable variety of the vegetable world. The small quantity of silex, potassa, soda, lime, iron, etc., which compose the ashes after combustion, constitute the rest. But these few *primary principles* enter into a great variety of definite combinations, which form distinct organized substances, which we term *proximate principles*. These, although composed of the same primary elements, yet, in consequence of the different proportions of them, and the different arrangements of their particles, possess properties altogether peculiar and different from each other.

Of these proximate principles of vegetable matter, the most abundant is the Lignin, or Woody Fiber, which constitutes the framework, and, as it were, the bones of all vegetation. It is insoluble in all ordinary menstrua, and is that portion of a plant which is left after having been fully digested in water, alcohol, ether, or dilute acids. It is, therefore, considered inert, and as possessing neither nutritive, nor medicinal properties.

Next in abundance, and first in importance in the constituents of plants, are those proximate principles which are capable of being *digested* or changed by the action of the gastric fluids, and which are thereby *assimilated* to the principles of the animal organism, and thus nourish

and sustain animal life. Such are starch, gum, mucilage, sugar, fixed oil, vegetable albumen, gluten, and a few others analogous to these. All vegetables in which these constitute a large proportion unmixed with other constituents that are deleterious, are useful for the food of man and animals.

But, beside these, there are a great number of other organized compounds or proximate principles found in the vegetable kingdom, which are incapable of being so assimilated, and, therefore, afford no nourishment to the animal tissues, but which, nevertheless, when taken into the system, or applied upon its surface, change, or in some way affect the action of the animal functions. Many of these, if taken in considerable quantities, derange, and even destroy the healthy action of those functions, and are thus regarded as *poisons*; yet, when those functions are deranged by disease, they serve, when administered in appropriate doses, to arrest such morbid action, and to restore such functions to their normal condition, and thus they become important medicines. It is the study of the nature of these substances, and their proper application to the preservation or restoration of health, that constitutes the high calling of the physician; and the proper mode of preparing and dispensing them, constitutes the scarcely less important avocation of the pharmacist and the apothecary.

In their earlier application to the healing art, those vegetables which contained medicinal properties were either administered in substance, in the form of powder, in which case all the woody fiber and other inert elements were thrown together into the stomach, often in large and repulsive doses, or else their more soluble principles were extracted by infusion or decoction, and given in copious and nauseating draughts.

The first of these forms is now seldom eligible, except for administering those vegetable products which nature herself has presented in a high degree of concentration, or of those whose medicinal principles are so very active, that the bulk thus required is not objectionable; and the latter may now be dispensed with, except in cases where it is desirable to present the medicine to the stomach very much diluted, or where the indications to be fulfilled make it expedient to accompany it with large draughts of hot or tepid fluids.

It was one step in progress, from these forms, to dissolve out the medicinal principles of plants or roots by Wine or Spirits, and present them in the form of medicinal tinctures. This was, in many cases, an improvement on the watery infusion or decoction, because such tincture could be preserved for some time unchanged, and thus be kept ready prepared for immediate use, but chiefly, because alcohol is an almost universal solvent of the medicinal proximate principles, many of which are scarcely soluble in aqueous fluids, and are, therefore, not extracted by such menstrua. But in many cases, even this form of dispensing medicine is very objectionable, on account of the large proportion of alcoholic

stimulus with which the medicinal principles are thus combined, and which renders them almost inadmissible in diseases of an inflammatory type. Of such a character are many of the numerous officinal tinctures still found in the pharmacopœia of the so-called regular practice. A few preparations of this kind may be still properly retained in the Eclectic Materia Medica, but it should be only those of the more powerful medicines of which the dose is sufficiently small, and these should be, mostly, saturated tinctures, containing as much of the medicinal principle of the substance as the menstruum will hold in solution. (*See Art. Tinctures.*)

Another improvement on the crude administration of vegetable medicines, was the formation of Aqueous Extracts, by dissolving out all the constituents of a plant that are soluble in boiling water, and then evaporating off the liquid until the exhausted matter was of a suitable consistence to be formed into pills. By this means, the bulky and inert lignin is dispensed with, and the medicinal agents presented in a form and bulk somewhat less objectionable. This is still an eligible form of presenting many valuable medicines. (*See Art. Extracts.*) But in most cases, it is liable to several objections, as, when the active principle is of a resinous or oleaginous character, it is very imperfectly soluble in water, and, therefore, the aqueous extracts of vegetables containing such principles are comparatively worthless, from the fact that the real active agent is still left behind in the refuse; again, if the medicinal principle is volatile, as it is in many instances, then it is dissipated and lost in the process. In other cases the active principle is of so delicate a nature as to be chemically decomposed and destroyed by the continuous action of the hot water necessary to the process. This is the case with the arum, sarsaparilla, stillingia, and many other most valuable remedies. Moreover, in this process, the starch, gum, mucilage, coloring matter, and all the other non-medicinal principles are extracted, as well as the medicinal, and as we do not know what proportion the latter bear to the former, in different specimens of the plant, the extract may appear well, and yet be almost inert.

The next great step, therefore, in the progress of pharmacy was to unite the principles of these two improvements, and form the Alcoholic Extracts. Alcohol, as before observed, is an almost universal solvent of those proximate principles of vegetables on which their medical virtues depend. I know of no principle of such activity as to deserve the name of medical, which, in its native combination, is not dissolved by this agent, either pure, or when diluted to the strength of proof spirit. The alkaloids, resins, essential and fixed oils, acids, salts, and neutral principles, all, as they are found in their native combinations, are soluble in these menstrua; while on the other hand, the non-medicinal principles, as starch and gum, which, next to the lignin, are the most abundant elements in most vegetables, are quite insoluble in pure

alcohol, and but partially soluble in dilute. By obtaining, therefore, an alcoholic or hydro-alcoholic tincture, either by digestion or displacement, and then distilling off the alcohol and carefully reducing the residue to a pilular consistence, an extract is obtained which, in the first place, fully contains all the medicinal principles of the substance in their native proportions, and, in the second place, is diluted by but a small proportion of those non-medicinal substances which abound in the watery preparations. These extracts, moreover, will generally keep unchanged, while those obtained by water, and especially the inspissated juices, which are the best preparations of that class, are liable to mold, or become otherwise decomposed.

Another important form of the alcoholic extract, and one that is justly becoming very popular, is that in which the concentration of the tincture is not carried to the pilular consistence, but is left in a fluid or semifluid state, and preserved from decomposition by the little alcohol in it, or by the addition of a sufficient quantity of sugar or other antiseptic. These are called Fluid Extracts, and will be referred to again, when the cases in which they should be preferred, and their peculiar advantages will be noticed. (*See Fluid Extracts.*)

Almost every article of the vegetable *Materia Medica*, might properly be prepared and presented in the form of alcoholic, or hydro-alcoholic extracts, either inspissated or fluid; for even where the active principle of a plant has been fully isolated, these preparations will often be found convenient. Still they are not perfect pharmaceutical preparations, for even alcohol dissolves the sugar, coloring matter, and other inert principles of vegetables with which the real medicine is combined, and as these are not uniform in their proportions, but vary according to the season of gathering, and other circumstances, such extracts are not, therefore, definite and uniform in their strength, even when made with the greatest care. And a source of still greater disappointment, is their ever varying quality, according to the *skill* and *honesty* of those who prepare them, and their strength is subject to no convenient test but that of actual demonstration. Therefore, when employed, those only should be relied on, which are made by pharmacutists of acknowledged skill and integrity.

But another step has been taken: these objections are obviated, and pharmacy placed among the exact sciences of the age. This consists in separating that proximate principle,—that peculiar organized substance on which the medicinal virtues of a plant depends,—from all the other substances with which it is combined, and thus presenting the very medicine itself, in a pure isolate state.

One great advantage of this improvement, is the smallness of the bulk to which medicines are thus reduced. Of these preparations, the physican can carry in his pocket an assortment, which once required a horse-load, and can administer in a single pill or delicate powder, a dose

at which, in its cruder forms, the stomach revolted. But it has another and even more important advantage than this, and that is the *definiteness* with which medicines so prepared can be apportioned.

In every other form in which vegetable medicines can be presented, their strength, as has been observed, is constantly subject to variation, and the physician is not only often in doubt what doses to prescribe, but is frequently at a loss whether to attribute his failure in obtaining the desired result, to the inertness of the medicine, or to his misjudgment in selecting the proper agent. Thus, for example, two samples of Peruvian Bark, or the ordinary tinctures or extracts obtained, may appear equally fair, and both be unadulterated, and yet one contain ten times the medicinal virtue of the other. But with regard to the *proximate principles*, this does not occur; the physician who prescribes one grain of quinia, knows just how much of the real medicinal substance he is administering, and it matters not whether it required twenty or two hundred grains of the bark to yield that amount,—itself, is definite and invariably of the same strength. In relation to these principles, the only question is, are they *pure*? And being definite chemical substances, their purity may in most cases be easily tested.

These *proximate principles* are divided into several general classes, distinguished by their general characteristics and reactions with other substances. These are the Acids, Fixed Oils, Essential Oils, Resins, Resinoids, and the Alkaloids, and perhaps a few others that cannot properly be classed with either of these.

Every medical plant, as has been before intimated, contains one or more of these principles, on which all its virtues as a medicine depends; and all the skill of the enlightened pharmacist is now called into requisition to separate these from their native combinations, and present them in their purest and most eligible forms.

Acids are, in general, readily recognized as those substances which give a sensation of sourness to the taste; but the term is chemically applied to all substances which redden vegetable blues, are electro-negative in relation to other principles, and combine with alkalies to form neutral compounds. The acidity of certain fruits, and other parts of vegetables must ever have been noticed, but it is of comparatively modern date that the different vegetable acids were distinguished from each other. We now recognize the *Malic*, *Citric*, *Tartaric* and *Oxalic* acids, as existing abundantly in fruits, etc., either pure, or combined with potassa in form of bi-salts, or those in which the acid predominates. In general, they are isolated from their native combinations by saturating them with an alkali or metallic oxide, and in this state, separating them by precipitation or crystallization, and then decomposing such neutral compound, and removing the alkaline or earthy base, by the superior affinity of some stronger acid, generally the sulphuric. After which, excepting the malic, they may be further purified by repeated crystallization.

These acids are used, in their uncombined state, to form cooling and febrifuge draughts, also as antiscorbutics, and in combination they form valuable hydragogue aperients. Beside these four vegetable acids, which are so manifestly distinguished by their sourness, there are several other electro-negative principles found in certain vegetables, as the benzoic, tannic, gallic, and other acids, all possessed of peculiar and valuable medical qualities; and by natural decay and destructive decomposition, an almost indefinite number of similar organic substances are found, capable of uniting with alkaline bases, and forming an endless variety of neutral compounds. But few of these have yet been examined, with reference to their medicinal action, and, therefore, with the exception of the well-known article, vinegar, which is formed by the combination of oxygen with liquids that have undergone the vinous fermentation, they form no part of the *Materia Medica*.

The Fixed Oils too were obtained and used in medicine at an early period. They are analogous to the acids in being electro-negative, and as such, they combine with alkalis, and form compounds called Soaps. They are obtained in abundance from many seeds and fruits by simple grinding and expression; but most of them, as of the olive and linseed, possess feeble medicinal powers, and are useful for food and in the arts, rather than as sanative agents. Indeed, it is probable that the medicinal virtues of most of the expressed oils depend, not on the oil itself, but on other peculiar principles held in solution by it, the same as the peculiar flavor and medical qualities of different kinds of spirits, as rum, brandy, gin, etc., depend not on any singularity of the alcohol itself, but on certain volatile oils dissolved in it. In some cases at least, as in that of mustard, the fixed oil may be obtained, by expression, bland and almost tasteless, while the more active principle is left behind, and may be afterward obtained by other means. A few of the expressed oils, however, as those of ricinus and croton tiglium, are powerful and valuable articles of the *Materia Medica*.

The Essential Oils constitute another important class of proximate medical principles. These differ from the fixed or expressed oils in being volatile without decomposition, and in being, for the most part, warm and pungent to the taste, and powerfully stimulant in their medicinal character. As the process of separating them from other substances is simple, many of them were long since discovered and prepared. They are mostly procured by the simple process of distillation; the plant, or the part of it containing the oil—usually in its recent state—is put into a large still, with a portion of water, and by converting the latter into steam, the volatile oil of the plant is carried over in vapor with it, and is condensed by passing through a suitable worm or condenser of other form. The oil separates from the water, for which it has no chemical affinity, and either floats or sinks, according as its specific gravity is greater or less than the water, and is thus easily separated.

In this manner are obtained the oils of mint, sassafras, cloves, etc., and with a few exceptions, all others of a valuable character. Gum camphor, so called, belongs to this class of medicines, being only an essential oil in a concrete or congealed state, at ordinary temperature; and several others, as those of the anise and the rose, assume this concrete form when the temperature is only moderately reduced. Several medicines of this class are used, and highly esteemed, in the Eclectic practice, which are yet wholly unknown to the old pharmacopœias, among which are the oils of *Erigeron Canadense* and *Erechthites Hieracifolius*.

From these oils we pass, by an easy transition, to another class of the proximate principles, viz.: the RESINS, many of which appear to be formed from the volatile oils by the absorption of oxygen, which renders them fixed and concrete. Thus, the purest *Camphene*, or oil of turpentine, by exposure to the air, combines with its oxygen, and is gradually changed into a diminished quantity of common rosin; and almost all essential oils become thickened and resinous by long standing, unless entirely excluded from the air.

The pure *resins*, and many *gums* with which they are compounded, were early found and recognized as dried exudations from certain trees. Their distinguishing characteristics are; their fusibility by heat, great inflammability, insolubility in water, solubility in alcohol or essential oils, and their capability of combining with alkalies, forming saponaceous compounds. The resins (or so called gums) of the various species of pine, spruce, and larch are of this character.

The *Gums*, properly so called, are distinguished by the opposite characteristics, not being fusible by heat, not readily inflammable, not soluble in pure alcohol, but soluble in water forming a viscid fluid, called mucilage; such are the gums of acacia, prunus, amygdalus persica, etc. These are articles of diet rather than medicine, and are used in pharmacy only as demulcents and vehicles to shield the action of more active agents.

There are, however, an intermediate class of articles called Gum-resins, partaking in part, of the properties of each of the above, and which are active and important articles of the *Materia Medica*; such are the gum myrrh, assafetida, ammoniac, and gamboge; but of these, the resinous portion is the medicinal one, for alcohol, which dissolves the resin and leaves the true gum, holds in solution all their medical virtues.

But there is another class of resinous substances, less abundant than those, which exude from the trees that contain them, and which possess medical virtues of a much higher degree. They exist in roots, and, in some cases, other parts of numerous plants, but combined with such large proportions of woody fiber and other principles, that they can be separated only by chemical agency. These possess, in general, the properties of the common resins, viz: fusibility, inflammability, solubility

in alcohol, and not in water, etc., but as they are not fully liquifiable by heat, and differ somewhat in other respects from the pure resins, we term them *Resinoids*.

Many of them may be obtained by the following simple process; form a saturated tincture of the root or plant desired, which is best done by displacement, or leaching alcohol through the ground material. From this tincture, distil or evaporate off the alcohol, having previously added plenty of water; the alcohol, which held the resin in solution, being thus removed, and the resin not being soluble in water, it is precipitated, while the other substances which the alcohol had dissolved out, as the extractive and coloring matter, being also soluble in water, are held in solution by the water and thus separated from the resinoid. The precipitate is then collected and purified by frequent washing, or by being redissolved in alcohol, and again precipitated—and is then dried and powdered for use. Thus may be obtained the resins of *podophyllum*, *cimicifuga*, *leptandra*, etc.

By this process alone, the resinoid is not obtained in its chemically pure state: it probably still contains from two to five per cent. of coloring and extractive matter, which, however, does not sensibly affect its use as a medicine. While a further purification would not only add to its cost, but might even endanger its activity. Its complete purification must be effected by redissolving it in alcohol, digesting the solution with animal charcoal, then filter, and again precipitate by water.

In some analyses, the resin has been separated by boiling the substance in milk of lime, or some other alkali, by which the resin is separated and rendered soluble, and from which solution it is precipitated by neutralizing the alkali with an acid. By this means the resinoid is obtained very cheaply, and very fair in appearance, but its medical property is nearly or quite destroyed. It is, indeed, no longer the resinoid, but probably bears the same relation to it that stearic acid, which has passed through the same process, does to stearin, and the precipitate thus obtained from *podophyllum* is not *podophyllin*, but *podophyllinic* acid. The process is an eligible one for scientific analysis, for as the stearic acid obtained is a correct indication of the amount of stearin contained in a given quantity of fat, so would this acidified resin be of the true resin or resinoid in a given quantity of the root. This was the process pursued by Mr. Wm. Hodgson of Philadelphia, in his analysis of *podophyllum*, as published in the United States' Dispensatory; but the process is entirely inapplicable in pharmacy, as the product is worthless. Mr. Hodgson did not obtain *podophyllin*, but *podophyllinic* acid; and yet Dr. J. Kost, who now professes to have made and recommended many of the resinoids before they were introduced at the Eclectic Institute in the summer of 1848, not only does not mention them in his "Family Physician," published one year previous, but in his *Materia Medica*, published in 1849, gives the above futile process for preparing

them, plainly showing that *up to that period*, he had never made a genuine article.

The introduction of these and analogous preparations into the *Materia Medica*, which is of very recent date, constitutes an era in medical practice, especially in that of the Eclectic schools of medicine. The distinguished and lamented Prof. T. V. Morrow, pronounced the discovery of the podophyllin alone, the greatest improvement in pharmacy that had been made for the last thirty years.

Until within the present century, the science of vegetable analysis was unknown; and within the last few years, the researches of chemists in this field had shown that many vegetables contained, among other proximate principles, those of a resinous or resinoid character; but, for the most part, such discoveries lay as dead and useless facts in the records of science, without being applied to any practicable use. Nor was it even ascertained, in most cases, that such resins contained any medical power, much less that they were the depositories of the principal, if not the whole medical virtues of the plants that contained them. To this there were a few exceptions; the resin of jalap was known to the profession, and used as an active medicine. Professor Tully, of New Haven, Connecticut, had obtained the resin of *cimicifuga*, and perhaps of some others, and recommended them to the attention of his medical brethren;* but it is not known that any other one ever prepared or used it. Professor John King, the author of the present volume, first discovered and separated the resins of the *podophyllum*, *cimicifuga*, *iris*, and several other roots, and used them successfully in his own practice for a series of years; and as early as July, 1844, in the "*New York Medical Philosophical Journal*," and again in April, 1846, in the "*Western Medical Reformer*," he introduced and recommended them to the Eclectic Medical profession, as valuable agents in several forms of disease; but these discoveries and recommendations had passed unheeded, and were unapplied, chiefly, it is presumed, because other practitioners could not devote the time and skill necessary to their preparation, and because no pharmacist had undertaken their manufacture. But in the summer of 1848, the writer of this article separated them, with several others of his own discovering, and having the advantage of being engaged in the *sale* instead of the *administration* of medicines, immediately put them up in a neat and eligible form, and thus directly presented them to the notice of the profession.

Since that time their sale and use have increased with an unexampled rapidity, which shows how high an estimate is placed on them. To the Eclectic branch of the profession belongs the honor of first discovering, testing and adopting them. Physicians of the Physo-medical school

* I am not aware that Prof. Tully ever obtained this resin, though he mentioned its existence to me.—J. K.

soon followed in the use of them, and their pharmacutists in their preparation and sale. And at the present time, hundreds of physicians of the old Allopathic schools are testing and adopting them.

The names applied to these resinoids, by the writer of this, on presenting them to the profession, have now become generally adopted, and which are formed by changing the termination of the generic name of the plant into *in*, after the analogy of *Resin*, or *Rosin*; thus from *Podophyllum*, we have *Podophyllin*; from *Leptandra*, *Leptandrin*, etc.

The most important of these Resinoids, when properly prepared, are dry and pulverizable, and are prepared for the profession in that form; but a larger proportion of this class of principles possess so much of an oleaginous character, or the resin is so combined with a fixed oil, that they cannot be reduced to the powdered state without injuring, if not destroying them. These we denominate *Oleo-resins*, and they are of all degrees of consistence, from the almost perfect fluid of the *Ptelein*, to the buttery spissitude of the *Xanthoxylin*, and the tough, gummy compactness of the *Cypripedin* and *Asclepidin*. But they all belong to the same general class of proximate principles, and are obtained precisely in the same manner as the dry resinoids, above described. And they are less popular and less used than the powdered resinoids, because they cannot be so conveniently combined with other medicine, and are not so easily administered as the dry. But they possess all the advantages of great concentration of medical power, and of perfect definiteness of strength, which is the distinguishing character of the pure proximate principles.

There is one class more of these medical principles, which deserves our special notice, and which, together with the resinoids just noticed, forms the acme of improvement in scientific pharmacy. This is the *Alkaloids*.

The Resinoids are electro-negative substances; the Alkaloids, electro-positive; those combine with alkalies and form saponaceous compounds,—these combine with acids and form salts;—those are mostly colored and opaque—these mostly white and crystalline. The great pioneers in this branch of Pharmacy were Pelletier and Caventou of France, who perfected the discovery of *Morphia*, *Cinchonia*, and *Quinia*, and who were the first to clearly define the chemical character of these agents, in about 1820. I say, *perfected the discovery*, for like every great improvement in art or science, there were previous discoveries approximating to the result.

The Alkaloids do not generally exist in vegetables in their pure state, but in the form of salts produced by their combination with some peculiar acid. Thus, *morphia* is found in opium combined with meconic acid, forming meconate of morphia, and *quinia* exists in the barks combined with kinic acid, forming a kinate of quinia. These native salts are in a greater or less degree soluble in water; but the pure alkaloids are very

sparingly soluble in that menstruum, although soluble in hot, and most of them, in cold alcohol. But as the processes of separating and purifying them are various and complicated, and are abundantly described in different works on the subject, the student is referred to them for that instruction. By these and similar processes, those substances which were once considered as homogeneous, have been analyzed, and made to yield those principles on which their virtues depend, pure and isolated. And those agents which are provided for the healing of our infirmities, are presented in doses, small, definite, and less repulsive.

But while we refer with pride to the work which has already been accomplished, we must not forget that the field has, as yet, been just entered. A vast expanse is yet to be explored. Not one-tenth of the articles of the *Materia Medica* have yet been analyzed, and in most of these even, the examination has been partial and imperfect. The physician, however, should not rest satisfied, nor the pharmacist stay his hand, until, as in the mineral, so in the vegetable kingdom, every known substance should be made to yield both its elementary and its proximate principles, separate and isolated; and the action of the latter on the animal economy, should be tested and made known.

ACETA.

Vinegars.

These are officinal liquid medicines, formed of vinegar, and charged by maceration with different medicinal principles. Many medicines contain active principles which are not readily soluble in water or alcohol, or are, perhaps, insoluble in them, but which are freely soluble in vinegar; others again, although soluble in water or alcohol, are not as efficient and energetic thus prepared, as when tinctured in vinegar; on this account, *medicated vinegars* are especially useful in many instances. The vinegar of commerce is very apt to contain impurities and principles which lead to its decomposition, hence, when used as a solvent for pharmaceutical purposes, it should always be purified by distillation. The solvent property of vinegar depends chiefly upon the acetic acid which it contains, and which renders it an excellent menstruum of the organic alkalies, which it converts into acetates, thereby in many instances producing more efficient preparations from them. Alcohol is usually added to medicated vinegars, on account of their proneness to spoil, and owing to which, it is preferable to prepare them only in small quantities that they may not be kept for any considerable length of time. Mr. W. S. Merrell states "that in the vinegars of lobelia, and sanguinaria (or where the color of the preparation is necessarily dark), good cider or wine vinegar is to be preferred to distilled vinegar; and in these preparations the alcohol necessary for their preservation should be *first* added

to the powdered ingredients so as to aid in dissolving their oily and resinous principles, and then displaced or expressed with the vinegar. When a pure vinegar is desirable, the acetic acid of the shops diluted with six parts of pure water, forms a more definite, and therefore, more eligible preparation than the *Acetum Destillatum*."

ACETUM DESTILLATUM. Distilled Vinegar.

Preparation.—Take of Vinegar a gallon. Distil, by means of a sand-bath, from a glass retort into a glass receiver, until seven pints have been distilled, when discontinue the process. Keep the seven pints for use.—*U. S.*

History.—In this distillation, the first portion which passes into the receiver, contains alcohol and pyro-acetic spirit, these being the most volatile ingredients; secondly, the acetic acid passes over in a purified condition, but being less volatile than water, it is weaker than it existed in the vinegar. A good substitute for distilled vinegar may be made by adding one part of strong acetic acid to five or six parts of distilled water, or sufficient to give the density of distilled vinegar, which is 1.005 to 1.006. A fluidounce of distilled vinegar should be saturated by thirty-five grains of crystallized bicarbonate of potassa, which is a proper test of its strength.

Wine vinegar is usually preferred to cider or malt vinegar, as it furnishes a stronger and more aromatic distilled article; and when distilled it should be in glass vessels, as the use of lead or copper vessels or tubes is extremely hazardous, from the danger of metallic impregnation. The surest test of the purity of distilled vinegar, is its saturating power, as above-mentioned; its specific gravity cannot be depended upon, as it will vary according to the amount of alcohol or pyro-acetic spirit which may be present.

Distilled vinegar is a clear, colorless liquid, having a faint but perceptible acetous odor and taste, less agreeable, however, than those of common vinegar. It is wholly evaporated by heat. It usually contains a small portion of organic matter which passes over in the distillation, which is liable to partial decomposition, and which, when thus decomposed, causes the reddish or brownish color upon saturation with an alkali. Pure distilled vinegar is devoid of any empyreumatic taste, or sulphurous odor; but that generally met with is slightly empyreumatic. It may be rendered unfit for pharmaceutical purposes by the presence of metals or mineral acids. If copper be present, saturate the vinegar with ammonia, and add ferrocyanuret of potassium, which occasions a brown cloud. If lead be present, the addition of iodide of potassium causes a yellow precipitate. If it be tainted with tin, the addition of a solution of chloride of gold will occasion a purplish color. Sulphureted-hydrogen occasions a dark-colored precipitate, when either of the two last metals are present and its non-action proves the absence of metals generally. Sulphuric acid may be detected by acetate of lead, or

chloride of barium ; muriatic acid by forming a precipitate with nitrate of silver ; and nitric acid by the solution of silver digested in the vinegar, which metal may subsequently be detected by muriatic acid.

Properties and Uses.—The properties of distilled vinegar are similar to those of ordinary vinegar, (see page 151).

ACETUM LOBELIÆ. *Vinegar of Lobelia.*

Preparation.—Take of Lobelia Seed, in powder, *four ounces* ; Distilled Vinegar *two pints*. Macerate the Lobelia Seed with the Distilled Vinegar, in a close glass vessel, for seven days ; then express the liquor, filter, and add to the filtered product, Alcohol *one fluidounce*.

History.—In this preparation, Diluted Acetic Acid may be used as a substitute for the Distilled Vinegar. The Alcohol is added to retard the decomposition, and as its quantity is very small, no objection can reasonably be made to its presence. We have known this preparation to retain its activity for two years, when kept well corked and not exposed to the action of light.

Properties and Uses.—Vinegar of Lobelia is an emetic, nauseant, and expectorant, and is a valuable relaxant in spasmodic affections. It may be given to fulfill all the indications for which lobelia is administered. Externally, it forms an excellent application in several cutaneous diseases, as salt-rheum, erysipelas, poisoning by rhus, etc. Dose, as an emetic, from one to four fluidrachms, repeated every fifteen minutes ; as an expectorant, from five to thirty drops or more, every half hour or hour, in elm or flaxseed infusion.

ACETUM SANGUINARIÆ. *Vinegar of Bloodroot.*

Preparation.—Take of Bloodroot, in powder, *four ounces* ; Distilled Vinegar, *two pints*. Macerate the Bloodroot with the Distilled Vinegar, in a close glass vessel, for seven days ; then express the liquor, filter, and add to the filtered product, Alcohol *one fluidounce*.

History.—In this preparation, Diluted Acetic Acid may be used as a substitute for the Distilled Vinegar. When kept well corked and in the dark, it may be preserved for a long time.

Properties and Uses.—Vinegar of Bloodroot is seldom used as an emetic, except in combination with other agents of this class. Its chief employment internally is as an expectorant, hepatic, and alterative. As an external application it is useful in many cutaneous affections. Dose, from ten to thirty drops, in some mucilage or syrup, and repeated three or four times a day.

ACETUM SCILLÆ. *Vinegar of Squill.*

Preparation.—Take of Squill, sliced or bruised, *four ounces* ; Distilled Vinegar, *two pints*. Macerate the Squill with the Distilled Vinegar, in a close glass vessel, for seven days ; then express the liquor, and set it by that the dregs may subside ; lastly, pour off the clear liquid, and add Alcohol *one fluidounce*.

History.—In this preparation, Diluted Acetic Acid may be used as a substitute for the Distilled Vinegar. When either of the above preparations are made with Diluted Acetic Acid, the addition of the Alcohol may be omitted. The Vinegar of Squill, when long kept, deposits, according to Vogel, a precipitate of citrate of lime and tannic acid.

Properties and Uses.—Vinegar of Squill contains all the medicinal virtues of the Squill. It is frequently prescribed as a diuretic and expectorant in several forms of dropsy, and in pulmonary affections. The syrup and oxymel are generally preferred, as they are less unpleasant to the taste, and do not decompose so soon. The dose is from half a fluidrachm to two fluidrachms; vomiting is likely to be caused by the latter quantity. It should be given in cinnamon-water, mint-water, or some other aromatic liquid calculated to conceal its taste, and obviate its nauseating effect. Its principal use, however, is in making the Syrup of Squill, *which see*.

ÆTHEREA.

Ethers.

Ethers are liquids resulting from the action of acids on alcohol. They are of a very volatile and inflammatory nature, possessing a peculiar fragrance, with some sweetishness, and vary in composition, according to the acid employed in generating them. On account of their highly inflammable character, too much care cannot be taken to avoid decanting them near a flame, as in the vicinity of a lamp, candle, or gas-light. They require to be kept in accurately stopped bottles, and in a cool place, otherwise considerable loss may ensue in consequence of their evaporation. Chemists admit three kinds of ethers, viz., 1. Those consisting of etherine and water, or where the acid does not enter into the composition of the ether generated, but merely acts as a chemical agent on the alcohol; of which we have an example in sulphuric ether. 2. Those consisting of an acid, etherine, and water, as in the case of hyponitrous ether. 3. Those consisting of an acid and etherine only, as with muriatic or hydrochloric ether. Of these the first two are more generally used in medicine.

ÆTHER ACETICUS. *Acetic Ether. Acetate of Oxide of Ethyle.*

Preparation.—Acetic ether may be formed by several processes, among which may be named the following: 1. Mix *one hundred parts* of Alcohol (sp. gr. 0.83) with *sixty-three parts* of concentrated Acetic Acid, and *seventeen parts* of strong Sulphuric Acid, and distil *one hundred and twenty-five parts* into a receiver, kept cold with wet cloths. 2. Distil a mixture of *ten parts* of Acetate of Soda, *sixteen* of Sulphuric Acid, and *six* of Alcohol. Rectify the product over lime and chloride of calcium. 3. Distil to dryness, a mixture of *three parts* of Acetate of Potassa, *three* of Alcohol, and *two* of Sulphuric Acid, and mix the distilled product with

one-fifth of sulphuric acid, and distil a second time an amount of ether equal to the alcohol employed. It may also be obtained by distilling any sulphovinate with strong acetic acid; the acetic acid is brought in contact with nascent ether, and combines with it.

History.—Acetic ether is a colorless liquid, of a refreshing, very grateful odor, and a peculiar, agreeable taste. It boils at 160° , and its specific gravity is 0.866. It does not decompose by keeping, but is easily changed by alkalies, yielding an acetate and alcohol; acids also decompose it. It is very combustible, burning readily when brought into contact with flame, at the same time, diffusing an acid odor. It is always present, in small quantity, in wine vinegar, which owes its flavor to this compound. It dissolves in seven and a half parts of water, and unites with alcohol in all proportions. It consists of one equivalent of acetic acid 51, one of etherine 28, and one of water $9=88$. Its formula is given as $C_4 H_5 O + C_4 H_3 O_3$, and by Gregory as $Ae O, Ac O_3$.

Properties and Uses.—Acetic ether is stimulant and antispasmodic, and is occasionally used to fulfill these indications. Sometimes it is applied externally, by frictions, to relieve rheumatic and neuralgic pains, and as a resolvent. The dose is from fifteen to thirty drops, sufficiently diluted with water.

ÆTHER HYDRIODICUS. *Hydriodic Ether.*

Preparation.—Mix *four parts* of Iodine with *ten parts* of Alcohol 38° . Add little by little *one part* of Phosphorus, and submit the whole to distillation. When the larger part of the alcohol has distilled over, add *three parts* more, and distil to dryness. The product of the distillation is mixed with water to separate the alcohol from the ether, which last is then rectified from chloride of calcium.

History.—Hydriodic ether has no acid reaction. Its odor is ethereal, its taste pungent, but less sharp than that of sulphuric ether. Its density is 1.9206 at 72° F.; it boils at 110° F., and is not inflammable. When thrown on burning coals, it expands in purple vapors. It is not decomposed immediately by potassa, nor by nitric or sulphurous acids, but sulphuric acid decomposes it, and sets free a part of the iodine. The action of the air discolors it slightly by liberating a little iodine, which may be readily removed by the alkalies, or mercury, a globule of which thrown into the vial, is sufficient to retain the ether in a state proper for inhalation. Its density admits of its being kept under water, in which it is insoluble. Its formula is $C_4 H_5 I$.

Properties and Uses.—Hydriodic ether, is recommended by Dr. Huette, by way of inhalation, as a remedial agent in several diseases, especially in pulmonary consumption, tubercular affections in any part of the body, and where it is desired to saturate the system quickly with iodine; it appears likely to play an important part in medicine. Fifteen to thirty grains of the hydriodic ether are transferred, by means of a graduated

pipette, into a little ground stoppered bottle, (3 or 4 centimetres) an inch to an inch and a half high. The ether is covered with a stratum of water about two or two and a half millimetres thick, the object of which is to moderate the evaporation; when the vial is applied to one of the nostrils, and the air contained within it is drawn by an inspiration. The ethereal vapor is sufficiently diluted with air before reaching the lungs. The evaporation of the ether may be accelerated by inclining the vial to one side, so that the continuity of the watery layer may be broken; and the heat of the hand may be applied to the same object. Fifteen or twenty inspirations suffice for the impregnation of the system with iodine, and a quarter of an hour after the cessation of the inhalations, iodine is found in the urine, and has also been found present in fifty or sixty hours afterward.

The physiological effects of this ether, are said to be, "After some inhalations, an impression of calmness and satisfaction announces that the hydriodic ether acts at first conformably with the sedative properties of the other ethers employed in medicine. The respiratory motions are carried on with a readiness and fullness, advantageous to the circulation; but the antispasmodic action of the ethereal vapor which favors the absorption of the remedy, is soon followed by the influence of the absorbed iodine. The increase of vigor ceasing to be limited to the thoracic muscles, extends to the muscular system. The appetite is developed, the secretions are increased, the genital feelings become more sensitive, the pulse acquires fullness, and the vivacity of the feelings, and the activity of the intellect, prove that the impulse given to the other organs extends to the brain also. Such are the effects that four daily inhalations of ten minutes each produced on Dr. Huette. As to accident, he never experienced anything but a little coryza, and frequently when the vapor has been too concentrated, a slight feeling of pressure in the temples."

He thinks, that in many cases there will be an advantage in substituting the inhalation of hydriodic ether, for the other preparations of iodine, observing that inhalation permits the fractioning of the doses to any extent, and causes the absorption of the medicine by more extended surfaces, more generally accessible in all their parts, and better calculated for the absorption of the smallest medicinal atoms, than are the digestive organs.

SPIRITUS ÆTHERIS NITRICI. Sweet Spirit of Nitre. Spirit of Nitric Ether. Solution of the impure Hyponitrite of Oxide of Ethyle in Alcohol.

Preparation.—Mix, in a large glass retort, Nitrate of Potassa, in coarse powder, *two pounds*, with Alcohol *nine pints and a half*; then gradually pour in Sulphuric Acid *a pound and a half*, and digest with a gentle heat for two hours; then raise the heat and distil a gallon. To the distilled liquor add Diluted Alcohol *a pint*, and Carbonate of Potassa *one ounce*, and again distil a gallon.—*U. S.*

History.—The officinal spirit of nitric ether is composed of hyponitrous ether and rectified spirit, in variable proportions. When a reaction is effected between alcohol and nitric acid, directly, or between alcohol and the ingredients from which nitric acid may be generated, as from nitre and sulphuric acid, the result is always hyponitrous ether; but when the ingredients for forming the ether hold alcohol in excess, this distils over with the ether, forming the spirit of nitric ether.

In the process for preparing this ether, given above, the sulphuric acid being gradually added to the mixture of nitre and alcohol in the retort, and a gentle heat applied, nitric acid is evolved, which reacting upon a portion of the alcohol, generates the hyponitrous ether. When the temperature is subsequently increased, the ether, together with the remaining alcohol, passes over as the sweet spirit of nitre, holding a portion of acid in the solution, from which it is purified by the last distillation from carbonate of potassa. The object in adding the diluted alcohol previous to the last distillation, is, that a quantity of the spirit of nitric ether may be obtained, equal to that procured by the first distillation without reducing the mixture in the retort to dryness, and thereby give rise to the formation of empyreuma. Were the alcohol and sulphuric acid to be first mixed together, instead of the alcohol and nitre, ordinary sulphuric ether would probably be generated, and the addition of the nitre would not give rise to the desired spirit of nitric ether. In conducting this process the retort should be of sufficient capacity to hold double the amount of articles employed.

Spirit of nitric ether, according to its strength, is either colorless or of the lightest straw color. When properly prepared it is a colorless, volatile liquid, requiring to be kept in well stopped bottles, possessing a peculiar and fragrant ethereal odor, somewhat resembling that of apples, and a pungent, sweetish, cooling, sharp taste; its specific gravity is between 0.834 and 0.837, and it boils, when heated by means of a water bath, at 160°. It gradually becomes acid by long keeping, in which state it becomes unfit for medical use, on account of its chemical reactions with other substances with which it may be united, in many instances greatly impairing the efficacy of the mixture; these effects may be obviated by keeping the sweet spirit of nitre standing on crystals of bicarbonate of potassa. It is very inflammable and burns with a whitish flame. It reddens litmus paper, but does not effervesce with carbonate of soda, unless it becomes acid. It is soluble in alcohol or water in all proportions.

Sweet spirit of nitre is very subject to impurities. When it is the product of a too long continued distillation, it contains at first, aldehyd, which subsequently becomes, by the absorption of oxygen, acetic acid. Aldehyd may be detected by the addition of a weak solution of potassa, which forming an aldehyd resin, communicates a yellow tint to the liquid containing it, in addition to which a pungent odor, with acridity will be

observed. An equal volume of sulphuric acid added to sweet spirit of nitre hardly affects it if good; but if much aldehyd be present, the mixture will become dark-colored. Acids may be detected by the effervescence of the preparation when the alkaline carbonates or bicarbonates are added to it. Alcohol and water are frequently added to sweet spirit of nitre, thereby very much impairing its value; it is extremely difficult to detect these adulterations.

Properties and Uses.—Sweet spirit of nitre is a stimulant, antispasmodic, diuretic and diaphoretic. It is considered useful in dropsy associated with diseased heart, more so than when connected with diseased kidney; being a stimulant diuretic, it is best adapted to asthenic conditions. In dropsy it may be advantageously combined with other diuretics, as syrup of squill, acetate of potassa, nitre, bicarbonate of potassa, or tincture of digitalis. It is useful in strangury, and is a good addition to copaiba as a diuretic for diluting the acrimony of the urine. It is often used in febrile affections, either alone or in conjunction with sedative or diuretic agents, for the purpose of inducing diuresis and diaphoresis. If the preparation becomes old, nitrous acid is, probably, formed, and when taken internally, it will give rise to pain in the stomach and griping. Spirit of nitric ether is a narcotic poison; the accidental inhalation of its vapor during sleep, has occasioned death. Dose, from half a fluidrachm to two fluidrachms, three or four times a day in water, or according to the indications to be fulfilled.

Off. Prep.—Mistura Copaibæ Composita.

ÆTHER SULPHURICUS. *Sulphuric Ether. Oxide of Ethyle.*

Preparation.—Gradually add in an open vessel, *fourteen fluidounces* of Sulphuric Acid, to Alcohol *two pints*, stirring them together frequently. While still hot, pour the mixture into a glass tubulated retort placed upon a sand-bath, and connected by a long adapter with a receiver kept cold by ice or iced water; then raise the heat quickly until the liquid begins to boil. When about *half a pint* of the ethereal liquid has passed over, gradually introduce into the retort through a tube reaching nearly to its bottom, Alcohol *two pints* previously mixed with Sulphuric Acid *two fluidounces*. Care must be taken that this mixture flow in a continuous stream, and in sufficient quantity to supply the place of the liquid which distils over; this may be accomplished by having the tube through which it flows furnished with a stop-cock to regulate the size of the current—the tube itself being passed through a cork accurately fitted into the tubulure. Then continue the distillation until about *three pints* have passed over, or until white vapors appear in the retort. To this distilled product add Potassa *six drachms*, previously dissolved in Distilled Water *three fluidounces*, and shake them frequently. At the end of twenty-four hours pour off the supernatant liquid into a retort, and with a gentle heat redistil it, until two pints of ether shall have

passed over, or until the distilled liquid becomes of the specific gravity 0.750.—*U. S.*

History.—Ether is formed from the action of sulphuric acid upon alcohol, and consists of four equivalents of carbon, five of hydrogen, and one of oxygen; its proximate constituents may be considered to be one equivalent of etherine, and one of water. It is commonly but improperly called *Sulphuric Ether*, probably on account of the sulphuric acid employed in its preparation; but no sulphuric acid enters into its composition, and the action of other acids on alcohol, will, it is stated, produce an identical ether.

The view taken of the formation of ether has been that, as alcohol is a hydrated oxide of ethyle, and ether, oxide of ethyle without water, the abstraction of the water from alcohol is all that is required to convert it into ether. To effect this removal of the water from alcohol, sulphuric acid is employed on account of its great affinity for water. The action, however, of the acid, is not direct but intermediate; when two equivalents of sulphuric acid are mixed with one equivalent of alcohol, the bi-sulphate of oxide of ethyle (sulphovinic acid), is formed, or a double sulphate of ether and water. When this is heated to about 285°, and the liquid kept in steady ebullition, it becomes decomposed, and the sulphuric acid seizing upon the water, prevents the ether from reuniting with it to reproduce alcohol, and the ether consequently distils over, leaving two equivalents of sulphuric acid with one of water in the retort, and one equivalent of ether in the receiver.

Ether, has, however, been produced without distillation, or the formation of the bi-sulphate of oxide of ethyle, by using a larger proportion of alcohol than is commonly employed, and causing the reaction to take place in glass tubes sealed and exposed for a short time to a temperature of 320°. From which it appears that the theory above given is a questionable one.

In the formula above given for the preparation of ether, the process is to be commenced by using only a part of the alcohol, and when decomposition has ensued and a portion of ether distilled over, the remainder of the alcohol is to be gradually added, so as to replace that which, during the progress of the distillation, is constantly disappearing by its conversion into ether. If, instead of this course, the whole of the alcohol were added at the first, a large portion of it would distil over with the ether. The small amount of acid added to the last portion, is deemed advantageous, on account of the weakness effected in the acid in the retort. The appearance of the white vapors during the distillation is indicative of the commencement of new reactions unlike those which generate the ether. However carefully the process may have been conducted, the ether is usually impregnated with sulphurous acid, heavy oil of wine, alcohol, and water, and consequently its purification becomes necessary. This is accomplished by the addition of potassa for sulphu-

rous acid and water, and water for alcohol, agitating the crude ether with the purifying agent, and redistilling at a gentle heat.

Ether is a colorless, very mobile, highly refracting liquid, having a penetrating and sweet odor, and a cooling, pungent, aromatic taste. When pure it has the specific gravity 0.713, boils at 95° , forming a vapor of the density 2.586. It does not freeze at 166° below zero. When imperfectly prepared or too long kept, it reddens litmus paper, but not when pure. It is very combustible, and its vapor is apt to form dangerous explosive mixtures with air. When slowly oxidized, it yields aldehyde, aldehydic acid, acetic and formic acids.

For medicinal purposes the density should not be greater than 0.750. It is extremely volatile, evaporating speedily in the open air with the production of much cold. It is highly inflammable, on which account it should never be brought near a lighted candle, or other flame; water and carbonic acid are the products of its combustion. It is decomposed by too long keeping, and is partly converted into acetic acid. Iodine and bromine are dissolved by it, and sulphur and phosphorus sparingly. It also dissolves fixed and volatile oils, many resins and balsams, caoutchouc, tannic acid, and most of the organic vegetable alkalies. It differs from alcohol in not dissolving potassa or soda; and it unites with alcohol in all proportions.

Dr. C. F. Schonbein states that if a little pure ether be put into a bottle filled with pure oxygen or atmospheric air, and exposed to diffused light, the bottle being occasionally shaken, the ether, after the lapse of four months, will have acquired new properties. Although producing no action upon blue litmus paper, it will discharge the color of solution of indigo, convert pure phosphorus, when immersed in it, into phosphorus acid, eliminate iodine from iodide of potassium, change pure sulphate of protoxide of iron to the basic and acid sulphate of the deutoxide, transform yellow prussiate of potassa into the red salt, convert sulphuret of lead into the sulphate, etc. Similar effects are produced with oil of turpentine and oil of lemons, when treated in the same way as the ether. He expresses an opinion that the property which these substances thus acquire, is due to the presence of oxygen in a chemically exalted condition.

Ether is frequently impure from the presence of foreign substances. If the impurity be an acid, it may be detected by litmus paper, and removed by agitation with potassa; if fixed substances are present, they will remain upon the evaporation of the ether. If heavy oil of wine is the impurity, it may be known by the milky appearance of the ether upon being agitated with water. In the officinal ether a portion of alcohol is generally present, but if there be too large a proportion of it, it will increase the density of the ether to too high a point. When this is the case, the alcohol may be removed by agitating the ether with twice its bulk of water; this fluid unites with the alcohol, and upon resting, forms

a heavy layer upon which the ether floats. The latter may be poured off, and purified by agitation with fresh burnt lime, and subsequent distillation.

Properties and Uses.—Ether is a powerful diffusible stimulant, and is likewise possessed of narcotic, antispasmodic, and expectorant properties. When applied externally, and allowed to evaporate, it acts as a refrigerant; but if its evaporation be repressed, it becomes a powerful rubefacient, and even vesicant. As a stimulant and antispasmodic it is used beneficially in low fevers attended with subsultus tendinum, nervous headache, cramp of the stomach, fainting, asphyxia, flatulent colic, gastrodynia, hysteria, asthma, dyspnoea, palpitation, and gout of the stomach; it is also efficacious when given alone, or in combination with oil of turpentine, in relieving the pain and spasm caused by the passage of biliary calculi. As an antispasmodic, it will be found useful in all forms of spasmodic action, unattended by inflammation, as chorea, epilepsy, tetanus, etc. The dose of ether is from ten to sixty drops, to be frequently repeated when the full effect of the remedy is desired.

When applied locally as a refrigerant, allowing it to evaporate, it is useful in nervous and other headaches, in external inflammations, strangulated hernia, etc. As a rubefacient, it may be employed in all cases where this effect is indicated, by checking its evaporation.

The virtues of many agents containing vegetable oils and resins, may be taken up by ether in the form of tincture, when, by evaporating the ether, the desired active product is left behind; this is the case with lobelia seeds, capsicum, scutellaria, podophyllum, ptelea, stillingia, xanthoxylon berries, iris, and several other officinal preparations. Under the name of *Letheon*, ether is sometimes employed as an anæsthetic agent, for the prevention and removal of pain and spasm, and whenever severe operations are about being performed. It has also been employed in this manner, in severe dysmenorrhea, as well as during parturition. To use it, a soft sponge, hollowed out on one side, is saturated with pure ether—this is applied to the nostrils of the patient, and inhaled by him; at first a short cough is generally produced, which soon disappears, and in from two to five minutes, or when about two fluidounces of ether have been expended, the anæsthetic effect takes place. A feeble and slow pulse during its use, or convulsions, indicate its discontinuance, and in the latter case, a free application of cold water. To produce anæsthesia chloroform is more commonly preferred. The practice of frequently inhaling ether is dangerous, often causing inflammation of the brain, or insanity.

Off. Prep.—*Lotio Ætheris Composita.*

PREPARATIONS OF AMMONIA.

AMMONIÆ CARBONAS. *Carbonate of Ammonia. Sesquicarbonate of Ammonia. Mild Volatile Alkali.*

Preparation.—Take of Muriate of Ammonia a pound; Carbonate of Lime, (Chalk) dried, a pound and a half. Pulverize them separately, then mix them thoroughly, and sublime with a gradually increasing heat, from an earthenware retort, into a receiver kept cold.—*U. S.*

History.—By the above process the following reactions happen; the muriatic acid unites with the lime, forming chloride of calcium and water, while the carbonic acid unites with the ammonia producing carbonate of ammonia. During sublimation the carbonate and water pass off together as a hydrated carbonate of ammonia, and the chloride of calcium is left behind. The retort used in this process should have a wide cylindrical neck, and for the purpose of facilitating the extraction of the sublimate, the receiver should be cylindrical. One equivalent of chalk, and one of muriate of ammonia, mutually decompose each other, but, as in the above formula, when an excess of chalk is added it causes a perfect decomposition of the muriate of ammonia, without which, a portion of this latter salt would sublime also, and thereby render the carbonate impure.

On the large scale, carbonate of ammonia is prepared by sublimation of the materials employed, from an iron pot, into a large earthen or leaden receiver. It may be manufactured from sulphate of ammonia, and indirectly, from gas-liquor, and bone-spirit.

Carbonate of ammonia is usually met with in white, translucent, fibrous and somewhat crystalline masses, moderately hard, of a powerful ammoniacal odor, and a strong, penetrating, alkaline and ammoniacal taste. When exposed to the air, it gradually becomes opaque and friable, loses ammonia, and falls to a powder of bicarbonate of ammonia. It is soluble in about four times its weight of cold water, and abundantly so in diluted alcohol; boiling water decomposes it, disengaging ammonia with effervescence. Acids decompose it, as do likewise the fixed alkalis and their carbonates, lime-water, magnesia, solution of chloride of calcium, alum, acid salts, solutions of iron, corrosive sublimate, acetate, and subacetate of lead, and sulphates of iron, and zinc.

It is sometimes, from faulty preparation, rendered impure by the presence of the sulphate or muriate of ammonia; the former may be detected by the solution, when neutralized with nitric acid, giving a white precipitate with chloride of barium, and the latter, by the neutralized solution yielding a precipitate with nitrate of silver. If turmeric paper held over it, undergoes no change, it has passed into the bicarbonate.

Carbonate of ammonia consists of two equivalents of ammonia 34.3, three of carbonic acid 66.36, and two of water 18=118.39.

Properties and Uses.—In large doses carbonate of ammonia is a powerful narcotic and irritating poison ; in small doses it is an energetic diffusible stimulant, diaphoretic, antispasmodic, and antacid. As a stimulant it is used in low stages of continued fever, in which it augments the action of the heart and arteries without producing an undue excitement of the brain, for which purpose it is also employed, as well as for its antacid properties, in atonic gout, and in derangements of the stomach arising from dissipation. In conjunction with guaiacum, it has proved beneficial in chronic rheumatism. It has also proved very beneficial in epilepsy, chorea, and scrofula, especially when attended with much acidity of the stomach. It has likewise proved serviceable in some cases of diabetes. It is rarely employed as an emetic in cases of paralysis in the dose of thirty or forty grains. It is much used as a stimulant in hysteria and fainting, combined with some aromatic oil, and known as *Smelling Salts*. Externally it is a gentle rubefacient, but is seldom employed in this way. The dose is from five to twenty grains every three or four hours, in the form of pill, or dissolved in some aqueous vehicle.

AMMONIÆ LIQUOR. *Liquor Ammoniac. Aqua Ammoniac. Solution of Ammonia. Water of Ammonia.*

Preparation.—Take of Muriate of Ammonia, in very fine powder, a pound ; Lime, recently burnt, a pound and a half ; Distilled Water a pint ; Water nine fluidounces. Break the lime in pieces, and pour the water upon it, in an earthen or iron vessel ; then cover the vessel, and set it aside till the lime falls into powder, and becomes cold. Mix this thoroughly with the Muriate of Ammonia, in a mortar, and immediately introduce the mixture into a glass retort. Place the retort upon a sand-bath, and adapt to it a receiver, previously connected, by means of a glass tube, with a quart bottle, containing the distilled water. Then apply heat, to be gradually increased till the bottom of the iron vessel containing the sand becomes red-hot ; and continue the process so long as the ammonia comes over. Remove the liquor contained in the quart bottle, and for every fluidounce of it add *three and a half fluidrachms* of Distilled water, or so much as may be necessary to raise its specific gravity to 0.96, and preserve it in small vials well stopped. Or it may be prepared by combining one part, by measure, of Stronger Solution of Ammonia, with two parts of Distilled Water.—*U. S.*

History.—In the above process the muriatic acid of the ammonia having a greater affinity for the lime, combines with it forming chloride of calcium and water, while the ammonia is set free, and passes into the receiver, where it is absorbed by the water. With this absorption there is an augmentation of the bulk of the fluid in the receiver, hence the receiver should be larger than required to hold the exact amount of water. Equal weights of muriate of ammonia and lime are sufficient for the production of the ammoniacal gas, but by the addition of an

excess of lime, the complete decomposition of the muriate of ammonia is insured.

Water is capable of absorbing 670 times its volume of ammoniacal gas at 50°, at the same time increasing its bulk about two-thirds. In the above process it contains about ten per cent. of ammonia. When prepared on a large scale, it is usually obtained from the sulphate of ammonia.

Liquor ammonia is a colorless, strongly alkaline liquid, having a peculiar, pungent odor, and a caustic, acrid taste. It is *incompatible* with acids, acidulous, and most earthy and metallic salts, and is much used for various pharmaceutical purposes. The salts of lime, baryta, and strontia, are not decomposed by it, and those of magnesia only partially. Lime-water causes a precipitate if the ammonia be partly carbonated. Upon neutralizing it with nitric acid, it will yield no precipitate, if pure, with chloride of barium, carbonate of ammonia, or nitrate of silver; if the first occasions a precipitate, it indicates the presence of sulphuric acid, or a sulphate; if the second, earthy matter is present; and if the third produces a precipitate, muriatic acid, or a muriate is indicated. A large proportion of the liquor ammonia of commerce is obtained from coal-gas liquor, and is liable to contain *pyrrol*, *naphtaline*, and other impurities. These may be distinguished by nitric acid, which reddens the solution, and by the liquor imparting a rich purple color to a strip of fir wood, after having been previously supersaturated with muriatic acid.

Properties and Uses.—Liquor ammonia is a powerful irritant and narcotic poison, producing in large doses tetanus and coma, and in smaller quantity inflammation or ulceration. In medicinal doses it is stimulant, sudorific, antacid, and rubefacient. It more especially stimulates the heart and arteries, without unduly exciting the brain. As an antacid it has been used in acidity of the stomach, sick-headache caused by acid stomach, heartburn, etc. It has likewise been used as a stimulant and antispasmodic in neuralgia of the face and head, asthma, pertussis, and delirium-tremens; and is highly recommended as an internal stimulant in cases of retrocession of old and obstinate cutaneous eruptions. Applied to the nostrils, it is sometimes beneficial in syncope, asphyxia, hysteria, and similar affections; and has been recommended as a rubefacient application to burns. It is employed externally in the form of liniment, combined with oils, as a rubefacient. I have used the liquor ammonia successfully in the treatment of hydrophobia, an account of which will be found in the Western Medical Reformer, Vol. VI, October, 1846, No. 4, page 83. The dose of liquor ammonia is from ten to thirty drops, largely diluted with water, to prevent its caustic influence on the mouth and throat. When swallowed undiluted, or in an overdose, it acts as a corrosive poison, and the best antidotes to

its dangerous effects are vinegar or lemon-juice, which must be promptly administered; they act by neutralizing the ammonia.

Off. Prep.—Linimentum Ammoniaë; Linimentum Capsici Compositum; Linimentum Saponis Camphoratum.

AMMONIÆ LIQUOR FORTIOR. LIQUOR AMMONIÆ FORTIOR. *Stronger Solution of Ammonia.*

Preparation.—The process for obtaining this is similar to that employed in procuring the Liquor Ammonia, the difference consisting only in the specific gravities of the two solutions, that of the present stronger solution being 0.882.

History.—Its properties are very similar to those of the Liquor Ammonia, being, however, more highly caustic, acrid, and alkaline. Its impurities are also similarly distinguished. In purchasing or preparing the solutions of ammonia, the apothecary should always ascertain their densities by the hydrometer; the stronger solution should be 0.882, the official solution 0.96. Both of these solutions should be kept in small vials, and well stopped, as they rapidly lose their ammoniacal strength by contact with the atmosphere.

Properties and Uses.—Undiluted, this solution of ammonia is entirely too strong for medicinal use. Its principal employment is externally as a rubefacient, vesicant, and caustic. The *vesicating ammoniacal ointment* of Dr. Gondret is prepared as follows: melt together by a gentle heat, *thirty-two parts of lard* and *two parts* of oil of sweet almonds, and pour the melted mixture into a bottle with a wide mouth. Then add *seventeen parts* of solution of ammonia of 25°, and mix, with continued agitation, until the whole is cold. Preserve in ground-stopper bottles, and in a cool place. If well prepared, it will vesicate in ten minutes.

LIQUOR AMMONIÆ ACETATIS. AMMONIÆ ACETATIS LIQUOR. *Solution of Acetate of Ammonia. Spirit of Mindererus.*

Preparation.—Take of Diluted Acetic Acid *a pint*; Carbonate of Ammonia, in powder, *a sufficient quantity*. Add the Carbonate of Ammonia gradually to the Acid, stirring constantly, until effervescence ceases. The Diluted Acetic Acid, directed in this formula, is to be made by mixing together Acetic Acid (sp. gr. 1.041) *a pint*, with Distilled Water *seven pints*.

This liquor may likewise be made by dissolving Carbonate of Ammonia *one scruple*, in Distilled Water *seven fluidounces*, and then gradually adding Acetic Acid, with frequent agitation, *a sufficient quantity*, until saturation, which is known by the cessation of effervescence. Owing to the unequal strength of the acetic acid of commerce, the latter is the more definite formula.

History.—In this process the carbonate of ammonia is decomposed by the acetic acid, the carbonic acid being evolved with effervescence,

while the acid unites with the ammonia, forming an acetate of ammonia; the result of this action is an aqueous solution of acetate of ammonia. The point at which saturation is reached may be ascertained by the alternate use of litmus and turmeric paper; and it is recommended to allow a slight acidity to prevail, which is owing to a small amount of carbonic acid being dissolved in the liquid, but which will become removed by time.

Solution of acetate of ammonia is a transparent and colorless liquid, with scarcely any odor, and a faint, mawkish, saline taste, but bitter when it contains an excess of alkali. It is very apt to spoil, and hence should be made only in small quantities at a time. It may be readily known by setting free acetic acid on the addition of sulphuric, and by giving an ammoniacal odor on the addition of caustic potassa; solution of sulphate of iron renders it reddish-brown. When evaporated in vacuo, very deliquescent crystals may be obtained. The pure solution is not colored by hydrosulphuric acid, nor precipitated by chloride of barium. Sulphureted hydrogen occasions a black precipitate if copper or lead enters into the solution; nitrate of baryta causes a white precipitate if sulphuric acid be present; and nitrate of silver a white precipitate if muriatic acid be present.

If the solution of acetate of ammonia is kept ready prepared in the shop, it should be left slightly acidulated; and when dispensed a small particle of carbonate of ammonia should be added to impregnate it anew with the carbonic acid gas which exhales by standing.

Solution of acetate of ammonia is *incompatible* with acids, the fixed alkalies and their carbonates, lime-water, magnesia, sulphate of magnesia, corrosive sublimate, the sulphates of iron, copper, and zinc, and nitrate of silver.

Mr. W. S. Merrell recommends the following preparation as an elegant and pleasant anodyne, and diaphoretic in fevers, worthy the notice of the profession; he calls it *Liquor Ammon. Acetat. et Morphia*: Take of Solution of Acetate of Ammonia *one fluidrachm*; Acetate of Morphia *one grain*; Syrup of Lemon *one fluidrachm*; mix together. The dose is from half a fluidrachm to a fluidrachm, to be taken in water. Each fluidrachm contains one-eighth of a grain of acetate of morphia.

Properties and Uses.—Solution of acetate of ammonia is diaphoretic and diuretic, and is used in febrile and inflammatory diseases. It proves diuretic when the patient is kept cool, and diaphoretic when he is kept warm. Externally, it has been used as an application, on hot flannel, to mumps, and likewise applied, by compresses kept constantly moist, in the hydrocele of children. In chronic ophthalmia, it forms an excellent collyrium, in the quantity of one fluidounce to seven fluidounces of rose-water, and two fluidrachms of laudanum. In porrigo of the scalp, it has been effectual, used as a lotion. The dose is from half an ounce to

one and a half fluidounces, every three or four hours, mixed with sweetened water.

Off. Prep.—*Lotio Ætheris Composita.*

AQUÆ MEDICATÆ.

Medicated Waters.

These consist of water variously impregnated with some medicinal substance; and as Eclectics occasionally employ them, a brief reference to them will be necessary.

When water is distilled from aromatic plants, it acquires their peculiar flavor as well as a portion of their medicinal qualities; this is chiefly owing to the volatile oil of the plants rising with the aqueous vapor and condensing with it in the receiver; but from the incapability of water holding much oil in solution, these preparations are generally possessed of but little strength. The most simple and easy process for the preparation of medicated waters, is to impregnate distilled water with the volatile oil by trituration with carbonate of magnesia, and then filtering; this course is now generally pursued in the preparation of most aromatic waters. The object of the carbonate of magnesia is to cause the oil to be more minutely divided, that it may present a larger surface to the action of the solvent. Other agents have been recommended for this purpose, as finely powdered glass or silica, porcelain-clay, and pumice-stone. It is very important that pure distilled water be used in the preparation of medicated waters, as any other may contain articles which will decompose or destroy the virtues of the oil.

AQUA ACIDI CARBONICI. *Carbonic Acid Water.* *Soda Water.* *Mineral Water.* *Artificial Seltzer Water.*

Preparation.—By means of a forcing-pump, throw into a suitable receiver, nearly filled with water, a quantity of Carbonic Acid Gas equal to five times the bulk of the water. Carbonic acid gas is obtained from powdered marble by means of dilute sulphuric acid.—*U. S.*

History.—Under common atmospheric pressure, water takes up its volume of carbonic acid gas; if the pressure be doubled, the quantity of the gas absorbed will also be doubled, and so on. Consequently, in saturating the water as above, with five times its volume of carbonic acid gas, it must be subjected to a pressure of five atmospheres.

Carbonic acid water is a sparkling liquid, having a pleasant, pungent, and slightly acidulous taste. It is known familiarly by the name of “soda water,” or, when put up in bottles and mixed with syrups of various kinds, as “mineral water.” The vessels which contain it should be kept in a cold place, and be perfectly tight, otherwise the gas will escape and the water lose its briskness. Too much care cannot be taken to avoid metallic impurities, especially of lead. The first daily

draught of carbonic acid water, from a fountain furnished with tubes of lead, should invariably be thrown away, as its use might give rise to unpleasant symptoms.

Carbonic acid, formerly called *fixed air*, is a colorless gas, of an odor somewhat subacid and pungent, and a slight acidulous taste. It combines with salifiable bases, forming salts which are called Carbonates, and from which it is driven off by all the strong acids. It reddens litmus, although the blue color is restored by boiling, the gas being given off. It extinguishes flame, and is quickly fatal when inhaled. If a light be introduced into a well, pit, mine, or other place, it will burn dimly or be extinguished if this gas be present, and the air of such place will certainly destroy life if respired. Its specific gravity is 1.527; and it is so much heavier than air that it may be poured from one vessel into another. The sparkling and effervescing properties of many kinds of wine, beer, cider, etc., are owing to the presence of carbonic acid gas. It is liquefied by a pressure of 36 atmospheres; and is solidified by removing the pressure, and allowing the gas, which almost instantly evaporates, to escape through a jet; this produces such a degree of cold as to freeze a part of the gas into a white solid like snow. When carbonic acid has accumulated in cellars or other places, so as to render them fatal to animal life, it may be removed by sprinkling about some *liquor ammoniæ*; this combines with the carbonic acid to form carbonate of ammonia, and fresh air rushes in to fill up the space produced by the condensation of the acid. It is composed of one equivalent of carbon 6, and two of oxygen 16=22; its formula is CO_2 .

Properties and Uses.—Carbonic acid water is diaphoretic, diuretic, and anti-emetic. It forms a pleasant drink in fevers, allaying thirst, lessening nausea and gastric uneasiness, and promoting diuresis. It may be administered four or five times daily in doses of from three to six fluidounces.

AQUA AMMONIÆ. (*See Ammoniæ Liquor.*)

AQUA AMYGDALÆ AMARÆ. *Bitter Almond Water.*

Preparation.—Rub Essential Oil of Bitter Almonds *sixteen minims*, with Carbonate of Magnesia *one drachm*, and gradually add, while continuing the trituration, Distilled Water *two pints*; filter through paper.

History.—This preparation is very liable to spontaneous decomposition, and should, therefore, be prepared only in small quantities at a time, or as required for use. If a drop of sulphuric acid be added to a pint of the mixture, and it be kept closely stopped and excluded from the light and air, it may be preserved for a long time. This is a preferable preparation to that made by distilling bitter almonds with water, which is much stronger than that made according to the above formula, and has been prescribed with fatal effects.

Dyspepsia
By Drink

Properties and Uses.—It is a sedative, affecting the system similarly to medicinal hydrocyanic acid, and has been employed alone, and in combination with other agents, in nervous cough, and various spasmodic affections. The dose of it, when freshly made, is two fluidrachms, which may be carefully and gradually increased to six or eight fluidrachms, and which may be repeated two or three times daily.

AQUA CALCIS. *Lime-Water.*

Preparation.—Add about *four ounces* of Unslaked Lime to Distilled Water *one gallon*. Stir it up well, and then set it aside for three or four hours. Then pour off the clear liquor as it may be wanted.

History.—This is a solution of lime in water, and may be made with pure spring or river water, instead of distilled water. Water dissolves but a very small proportion of lime, and in larger quantity when cold than when hot; hence the propriety of employing cold water in the process. Lime-water is colorless, inodorous, and of a disagreeable alkaline taste; it forms an imperfect soap with oils, and changes vegetable blues to green. It attracts carbonic acid from the atmosphere, with the formation of carbonate of lime, on which account it should be kept in closely stopped bottles, or what is more convenient, in bottles containing an excess of lime.

Properties and Uses.—Lime-water is antacid, anti-lithic, tonic, and astringent. It has been recommended in epilepsy, palpitation of the heart, and spasmodic diseases generally, accompanied with acidity of stomach, also in painful affections of the stomach dependent on disordered digestion, as pyrosis and gastrodynia. It is likewise beneficial in chronic dysentery and diarrhea, and diabetes, especially when given in combination with a decoction of white oak-bark. In dyspepsia, phthisis, and other forms of disease, where from acidity of the stomach the usual food is rejected, or if retained gives rise to much uneasiness and unpleasant symptoms, one part of lime-water added to three parts of good sweet milk, has been found useful both as medicine and diet. A tablespoonful of lime-water will often allay vomiting. It has been advantageously used as an injection in gleet, gonorrhea, leucorrhea, ulceration, and increased discharges from the bladder; in all instances during the absence of inflammation. Externally, it has been applied as a wash in tinea capitis, scabies, foul and gangrenous ulcers, and when mixed with linseed oils forms a liniment of much value in burns and scalds. It has frequently been employed as a vermifuge in combination with worm-seed oil, or some other anthelmintics. If its use be too long continued, it debilitates the stomach. An overdose produces unpleasant symptoms; the remedies for which are bland and mucilaginous drinks. The dose of lime-water is from four fluidrachms to four fluidounces; it is best taken in an equal measure of milk.

Off. Prep.—Linimentum Calcis.

AQUA CAMPHORÆ. *Camphor Water.*

Preparation.—Triturate Camphor *two drachms* with Alcohol *forty minims*, then add Carbonate of Magnesia *four drachms*, and continue the trituration, and finally, gradually add Distilled Water *two pints*; when all is well rubbed together, filter through paper.

History.—By the above process one fluidounce of water is made to contain over three grains of camphor. The first trituration with the alcohol, deprives the camphor of its cohesiveness, and renders it more readily pulverizable, and the subsequent trituration with carbonate of magnesia effects a very minute division of it, so that a permanent solution of camphor is obtained, of sufficient strength to exert an influence on the system. The filtration separates the magnesia.

Properties and Uses.—Camphor water is chiefly used in low fevers and typhoid conditions, for the purpose of quieting restlessness and other symptoms of nervous derangement or debility. It has also been employed to allay uterine after-pains, and in all cases where camphor is indicated. The dose is from half a fluidounce to two fluidounces repeated every one or two hours.

Off. Prep.—Mistura Camphoræ Composita.

AQUA CINNAMOMI. *Cinnamon Water.*

Preparation.—Triturate Oil of Cinnamon *half a fluidrachm* with Carbonate of Magnesia *a drachm*, and then with Distilled Water *two pints*, to be gradually added; finally filter through paper.

Properties and Uses.—Cinnamon water should be cautiously used in inflammatory complaints. It is useful in passive hemorrhage from the lungs, stomach, kidneys, or uterus, and in chronic diarrhea and dysentery; and is much employed as a vehicle for other less agreeable medicines. It will sometimes allay vomiting. The dose is from two fluidrachms to two fluidounces.

AQUA DESTILLATA. *Distilled Water.*

Preparation.—In a clean retort kept only for this purpose, place Water *ten gallons*. First distil *two pints* and throw them away; then distil *eight gallons*. Keep the Distilled water in glass bottles, well stopped.

History.—Distilled water, although not a medicated water, is introduced here, partly to avoid a separate place for it, and partly on account of its extensive employment in the preparation of medicated waters. For medicinal purposes, distilled water should undergo no change by sulphureted hydrogen, nor on the addition of tincture of soap, subacetate of lead, chloride of barium, oxalate of ammonia, nitrate of silver, or lime-water, and should evaporate without residue. In many pharmaceutical and chemical processes, distilled water is very essential, while in others pure spring or river, or rain water will be sufficient. As the first portion of

water which comes over during distillation is apt to contain carbonic acid, or other volatile impurity, it is commonly rejected. For the properties and uses of water, see *Aqua* in Part I.

AQUA MENTHÆ PIPERITÆ. Peppermint Water.

Preparation.—Triturate Oil of Peppermint *half a fluidrachm*, with Carbonate of Magnesia *a drachm*, then with Distilled Water *two pints*, to be gradually added; finally, filter through paper.

Properties and Uses.—Peppermint water is used as an antispasmodic and carminative, in flatulence and flatulent colic, to allay nausea and vomiting, and as a gentle aromatic stimulant. The dose is from four fluidrachms to two fluidounces, three or four, or more times a day.

Off. Prep.—Mistura Camphoræ Composita.

AQUA MENTHÆ VIRIDIS. Spearmint Water.

Preparation.—Triturate Oil of Spearmint *half a fluidrachm*, with Carbonate of Magnesia *a drachm*, then with Distilled Water *two pints*, to be gradually added; finally, filter through paper.

Properties and Uses.—Similar to those of peppermint water, to which some persons prefer it. The dose is also the same.

Off. Prep.—Mistura Camphoræ Composita.

AQUA PICIS LIQUIDÆ. Tar Water.

Preparation.—Take of Tar *two pints*, Boiling Water *a gallon*. Mix together, and stir with a wooden rod for fifteen minutes. When cold, and the tar has subsided, strain the liquor and keep it in well stopped bottles.

Properties and Uses.—Tar water is stimulant and diuretic, and exerts an influence more especially on mucous membranes, hence it has been found useful in chronic catarrhal and urinary affections, in doses of one or two pints daily. Sometimes tar water is prepared in pulmonary affections, as above-named, with an addition of Honey *two pints*. Externally, it is useful as a wash in several chronic cutaneous diseases.

AQUA PIMENTÆ. Pimento Water.

Preparation.—Triturate Oil of Pimento *two fluidrachms*, with Powdered Silex *two drachms*, then with Distilled Water *one gallon*, to be gradually added; finally, filter through paper.

Properties and Uses.—Carminative in the dose of one or two fluidounces.

AQUA HEDEOMÆ PULEGIOIDES. Pennyroyal Water.

Preparation.—Triturate Oil of American Pennyroyal *half a fluidrachm*, with Carbonate of Magnesia *a drachm*, then with Distilled Water *two pints*, to be gradually added; finally, filter through paper.

Properties and Uses.—Pennyroyal water may be used for the same purposes and in the same doses as peppermint and spearmint waters, to which some persons prefer it.

AQUA ROSÆ. Rose Water.

Preparation.—To the fresh petals of Hundred-leaved Roses *eight pounds*, add Water *two gallons*. Distil one gallon.

History.—When thus prepared rose water has the fragrance of the rose in great perfection; but is liable to spoil by long keeping, especially if exposed to the action of light and air. It may also be prepared in the same manner as pursued for Cinnamon Water; or by distilling together water and the oil of roses.

Properties and Uses.—Rose water is destitute of any irritating properties, and is much used in collyria and other lotions, chiefly on account of its agreeable odor; applied to the eye, it has a slightly stimulating and cooling influence.

AQUA SAMBUCI. Elder Flower Water.

Preparation.—To Fresh Elder Flowers *ten pounds*, add Water *two gallons*, distil one gallon.

Elder flowers yield very little oil; the water distilled from them is sometimes used in collyria and other lotions.

N. B. Medicated Waters are frequently made by adding to a *few pounds* of the leaves or flowers of the article required, *six or seven fluid-ounces* of proof spirit, and *two gallons* of water; from which one gallon is distilled. In this way was formerly obtained nearly all of these preparations, but the processes given above, are now esteemed the best. Aqua Florum Aurantii, *Orange Flower Water*, Aqua Fœniculi, *Fennel Water*, Aqua Menthæ Piperitæ, *Peppermint Water*, Aqua Menthæ Viridis, *Spearmint Water*, together with several others may be procured from the plant or flowers, by the mode of distillation just referred to.

CATAPLASMATA.
Cataplasms.

Cataplasms or poultices are substances intended for local application; they are always moist, and of a consistence not to adhere firmly to the skin, nor to spread over the parts adjacent to their application. They are of various kinds; some are discutient, others favor suppuration; some again are refrigerant, and others emollient, or stimulating. They are usually applied tepid or warm, and should not be allowed to dry previous to being renewed.

CATAPLASMA CARBONIS. Charcoal Cataplasm.

Preparation.—Macerate Bread, *two ounces*, with Water *ten fluidounces*, for a short time near the fire; then gradually add and mix with it Powdered Flaxseed *ten drachms*, stirring so as to make a soft cataplasm. With this mix Powdered Charcoal *two drachms*, and when prepared for application, sprinkle *one drachm* of charcoal on the surface of the cataplasm.

Properties and Uses.—As recently prepared charcoal absorbs the principles on which the offensive odor of putrid animal matter depends, this cataplasm will be found an excellent application to foul and gangrenous ulcers, correcting their fetor, and improving their condition. It should be renewed two or three times in every twenty-four hours.

CATAPLASMA DAUCI. *Carrot Cataplasm.*

Preparation.—Take of Garden Carrots, scraped, *four ounces*, Indian-meal *one ounce*, Boiling Water a *sufficient quantity* to form a cataplasm of the proper consistence.

Properties and Uses.—This will be found a valuable application to indolent and gangrenous ulcers, and painful tumors.

CATAPLASMA FERMENTI. *Yeast Cataplasm.*

Preparation.—To *one pint* of Milk, tepid, add Yeast *four fluidounces*, and fine Slippery Elm bark a *sufficient quantity* to form a cataplasm of the proper consistence.

Properties and Uses.—This is valuable as an antiseptic application. It will be found especially serviceable in gangrenous ulcerations, the fetor of which it corrects, while it hastens the suppuration of the slough.

CATAPLASMA LINI. *Flaxseed Cataplasm.*

Preparation.—To Boiling Water *ten fluidounces*, add gradually, Powdered Flaxseed *four ounces and a half*, or a *sufficient quantity*; stir constantly, so as to make a cataplasm.

Properties and Uses.—This forms a convenient emollient poultice, to relieve the tense condition of the vessels in inflammation, and to promote suppuration. Fresh lard, or olive oil spread over its surface, will preserve its softness, and prevent it from adhering to the skin.

CATAPLASMA LOBELIÆ. *Lobelia Cataplasm.*

Preparation.—To *equal parts* by weight of Powdered Lobelia and fine Elm bark, add a *sufficient quantity* of weak Ley, warm, to form a cataplasm.

Properties and Uses.—This forms an excellent application to felons, white-swelling, wounds, fistula, inflammation of the breast and other parts, stings of insects, erysipelatous inflammations, and painful swellings or ulcerations. It should be frequently renewed.

CATAPLASMA OXYCOCCI. *Cranberry Cataplasm.*

Preparation.—Take of ripe Cranberries *any quantity*, and bruise them to form a cataplasm.

Properties and Uses.—Applied around the throat in quinsy, and in swelling of the glands of the throat in scarlatina and other diseases, I know of no more useful agent; its action is very prompt, relieving in a few hours. It has been likewise reputed useful in cancerous ulcers, erysipelatous inflammations, and gouty-rheumatism.

CATAPLASMA PHYTOLACCÆ. *Poke-root Cataplasm.*

Preparation.—Place fresh Poke-root in hot ashes to roast, when sufficiently done, mash it, and form a cataplasm.

Properties and Uses.—This may be applied to all kinds of tumors in order to discuss them; or if they be too far advanced, it will hasten suppuration. In the latter instance its action is accompanied with much pain. It is especially valuable in tumors of an indolent character, as bubos. It should be renewed two or three times a day.

CATAPLASMA STRAMONII. *Stramonium Cataplasm.*

Preparation.—Take of the fresh Leaves of Stramonium *any quantity*, bruise them, and add a small quantity of hot Water to form a sufficiently moist cataplasm.

Properties and Uses.—I have found this a decidedly efficacious application in peritoneal inflammation, the whole abdomen is to be covered with it; likewise in acute rheumatism, and in gastro-intestinal inflammations. Applied to the perineum in enlargement of the prostate, for the purpose of securing the passage of the catheter in case of retention of urine, when it cannot otherwise be entered into the bladder, I know of no better agent—it should remain on the parts about an hour, before attempting the introduction of the catheter. It will be found valuable in all rheumatic or neuralgic pains.

CATAPLASMA ULMI. *Elm Cataplasm.*

Preparation.—Take of Powdered Elm bark a *sufficient quantity*; stir it in hot Water, or Milk and Water, to the consistence of a cataplasm.

Properties and Uses.—This cataplasm is of almost universal application, and is superior, in many respects, to every other. As an application to painful swellings, inflammations, ulcerations, and to facilitate the separation of the slough produced by caustics, and for various other purposes, it stands, and justly too, in high repute among Eclectic physicians.

CERATA.

Cerates.

These are substances of an unctuous character, and are usually composed of lard or oil combined by means of heat with wax, spermaceti, or resin, and to which various medicinal agents are often added. They have a consistence between those of ointments and plasters, and at the ordinary temperature of the atmosphere, are capable of being spread upon linen or leather, by means of a spatula; and when applied to the surface of the body, they do not melt or run. In the preparation of cerates, the apothecary should be very cautious not to employ oil or lard which possesses the slightest degree of rancidity; fresh and sweet articles of this

kind must alone be used. A gentle heat will be sufficient to effect the fusion, and this is best obtained by means of a water bath; and when the mixture is cooling, it should be constantly stirred, and the portions which concrete on the sides of the vessel should be removed from time to time, and mixed thoroughly with the more fluid portion, until the whole attains the proper consistence. In the preparation of a large quantity of cerate, it is better to heat the vessel in which the cooling takes place, previous to pouring in the mixture, so that the portion next the vessel may not cool too suddenly and render the mixture less uniform in its consistence.

CERATUM CALAMINÆ. *Calamine Cerate. Turner's Cerate.*

Preparation.—Take of Yellow Wax *three ounces*, Lard *one pound*, melt them together, and when upon cooling they begin to thicken, add Prepared Calamine *three ounces*, and stir the mixture constantly until cool.

Properties and Uses.—This cerate is mildly astringent, and may be used in excoriations and superficial ulcerations, produced by irritating secretions, chafing of the skin, burns, scalds, or other causes.

CERATUM CETACEI. *Spermaceti Cerate.*

Preparation.—Melt together White Wax *three ounces*, and Spermaceti *one ounce*; then add of Olive Oil, previously heated, *six fluidounces*, and stir the mixture until cool.

Properties and Uses.—This cerate is employed as a mild dressing for blisters, wounds, and excoriations; and as the basis of more active preparations.

CERATUM CROTONIS. *Croton Oil Cerate.*

Preparation.—Melt Lard *five ounces*, with White Wax *one ounce*, and when nearly cool, add Croton Oil *two ounces*, and stir until cool.

Properties and Uses.—Croton oil cerate is a rubefacient and vesicant, and may be used in all cases where such actions, or counter-irritation, are demanded.

CERATUM RESINÆ. (*Unguentum Resinæ Albæ.*) *Resin Cerate. Basilicon Ointment.*

Preparation.—Melt together, Rosin *five ounces*, Lard *eight ounces*; Yellow Wax *two ounces*; then strain through linen to remove impurities which are apt to be present in the rosin, and stir the mixture constantly until cool.

Properties and Uses.—This cerate forms a gently stimulant application to blistered surfaces, indolent ulcers, burns, scalds, and chilblains.

CERATUM SABINÆ. *Savine Cerate.*

Preparation.—Take of Savin, in powder, *two ounces*; Resin Cerate *a pound*. Mix together.

Properties and Uses.—Savine Cerate is used as a dressing to perpetual blisters, in preference to the fly ointment, as it has no tendency to

produce strangury. It has a fine deep-green color, with the odor of the leaves, and as exposure impairs its properties, it should be kept in closely covered vessels. The white coat which forms upon the blistered surface during the use of this cerate, should be occasionally removed, as it prevents its contact with the surface.

CERATUM SIMPLEX. *Simple Cerate.*

Preparation.—Melt together, Lard *eight ounces*, White Wax *four ounces*; and stir constantly until cool.

Properties and Uses.—Simple Cerate is a very mild application to irritated surfaces, and is used for dressing blisters, wounds, etc.; and also improperly employed as a vehicle for many substances to be applied by inunction. The lard employed in its preparation should be perfectly free from rancidity, and the heat should be as gentle as possible, so as not to produce the least decomposition. It should be put up in small jars, and closely covered with tin foil, in order to exclude the air.

CEREI. CEREOLI.

Bougies.

Preparation.—Bougies are made by dipping strips of soft linen cloth, rather wider at one end than at the other, into certain emplastic or elastic compositions, folding them closely, and rolling them firmly on a smooth slab. For elastic bougies, pieces of catgut, bundles of thread, etc., are sometimes used. The following are some of the compositions held in most repute:—

1. **BELL'S.**—Lead plaster *four ounces*; Yellow Wax *one ounce and a half*; Olive Oil *three drachms*.

2. **HUNTER'S.**—Olive Oil *three pounds*; Yellow Wax *one pound*; Red Lead *one pound and a half*; boil together over a slow fire till combined.

3. **SWEDIAUR'S White.**—White Wax *one pound*; Spermaceti *three drachms*; Acetate of Lead from *two drachms to one ounce*; boil together slowly.

4. **PIDERIT'S Wax.**—Yellow Wax *six parts*; Olive Oil *one part*.

5. **GOULARD'S.**—Yellow Wax *six ounces*; melted and mixed by stirring with Goulard's Extract of Lead from *two drachms to two ounces*.

6. **ELASTIC.**—Boiled Linseed Oil *twelve ounces*; Amber *four ounces*; Oil of Turpentine *four ounces*, in which is dissolved Caoutchouc *five drachms*. Melt and Mix the articles well together, and spread the compound at three successive intervals upon a silk cord or web. Place the pieces, so coated, in a stove-oven heated to 150° F., and leave them in it for twelve hours adding fifteen or sixteen fresh layers in succession, until the instruments have acquired the proper size. Polish first with pumice-stone, and finally smooth with tripoli and oil.

Bougies are usually employed for dilating strictures, as of the urethra, vagina, neck of the uterus, and rectum. The largest size that can be conveniently introduced is first used, and the size gradually increased as the treatment progresses. The wax bougie is often employed for obtaining the form of an urethral stricture, its location and distance from the external orifice.

CONFECTIONES.

Confections or Conserves.

CONFECTIO ROSÆ. *Conserve of Roses. Confection of Roses.*

Preparation.—Rub Red Roses, in powder, *four ounces*, with Rose Water *eight fluidounces*, heated to 150° ; then gradually add Refined Sugar, in powder, *thirty ounces*; Clarified Honey *six ounces*. Beat the whole together in a marble mortar, until thoroughly mixed. An iron mortar will not answer.

Properties and Uses.—This confection is slightly astringent, but is almost exclusively used as a vehicle of other medicines, or to impart consistence to the pilular mass.

CONFECTIO SENNÆ. *Confection of Senna. Electuary of Senna. Lenitive Electuary.*

Preparation.—Take of Senna *eight ounces*; Coriander [seed], *four ounces*; Liquorice Root, bruised, *three ounces*; Figs *a pound*; Pulp of Prunes, Pulp of Tamarinds, Pulp of Purging Cassia each *half a pound*; Sugar [refined], *two pounds and a half*; Water *four pints*. Rub the senna and coriander together, and separate ten ounces of the powder with a sieve. Boil the residue with the figs and liquorice root, in the water, to one-half; then press out the liquor and strain it. Evaporate the strained liquor by means of a water-bath to a pint and a half; then add the sugar and form a syrup. Lastly, rub the pulps gradually with the syrup, and having thrown down the sifted powder, beat the whole together till they are thoroughly mixed.—*U. S.*

History.—The confection of Senna, when properly made, is an elegant preparation. The pulp of purging cassia is most conveniently obtained by boiling the bruised pods in water, straining the decoction, and evaporating to the consistence of an electuary. The pulp of prunes may be prepared by boiling the fruit in a small quantity of water to soften it, then pressing it through a hair sieve, and evaporating to a proper consistence. The tamarinds, when too dry for immediate use, may be treated in the same manner. In each case, the evaporation should be completed by means of a water-bath, in order to prevent the pulps from being burnt.

Properties and Uses.—This is one of our best and most pleasant laxatives, being admirably adapted to cases of habitual costiveness, especially

in pregnant women and persons affected with piles. It is also very useful in the constipation which is apt to attend convalescence from fevers and other acute diseases. The mean dose is two drachms, to be taken at bed time.—*U. S. Disp.*

Off. Prep.—Confectio Sennæ Composita.

CONFECTIO SENNÆ COMPOSITA. *Compound Electuary of Senna. Pile Electuary.*

Preparation.—Take of Cream of Tartar and Pulverized Jalap of each one ounce; Confection of Senna two ounces; Flowers of Sulphur and Nitrate of Potassa, of each, half an ounce; Molasses, sufficient to make a thick pill mass.

Properties and Uses.—Excellent for the blind and bleeding piles, and constipation. Half a drachm to a drachm may be taken every night dissolved in water; or it may be made into four-grain pills, of which four may be taken night and morning.

DECOCTA.

Decoctions.

Decoctions are solutions of the medicinal virtues of various parts of plants, obtained by boiling these parts in water. The soluble principles of medicinal plants are generally more readily removed by water maintained at the boiling point, than at a lower temperature; consequently decoction, in many instances, is preferred as a method of extracting the greatest degree of activity of the medicinal virtues of plants. The process of boiling should always be conducted in a vessel so covered as to confine the vapor over the surface of the liquid, and at the same time, prevent the access of atmospheric air, which frequently exerts an injurious influence upon the active principle; and as a general rule, the boiling should not be long continued, as the various principles existing in the plants may react upon each other, and impair their therapeutical influences. Vegetables, in which the active principle is volatile, in which ebullition would produce an unfavorable change so as to impair its activity, or in which it exists in combination with some inert or disagreeable principles not required, are not proper subjects for decoction, and in the latter instance, especially when the objectionable principles are to be obtained only at the boiling point. Decoctions should always be strained while hot.

Dry substances, as roots, barks, woods etc., submitted to decoction, should be powdered, sliced, or bruised, according to their character, and the purest and safest water should be selected for use. Sometimes previous maceration will be found beneficial by removing the cohesion of the vegetable fiber. In compound decoctions, where several articles are to be boiled together, the various ingredients should be added at different periods of the process, according to the length of time required to

extract their virtues; and should any of them possess a volatile active principle, it should be added at the last stage of the boiling to the hot decoction, which should be allowed to cool in a covered vessel.

Tin or iron vessels are most commonly preferred in the preparation of decoctions; but iron utensils should never be used when astringent vegetables are employed. In some cases, glass or earthenware vessels are the best, as those made of metals are frequently corroded by the ingredients of the decoction.

Decoctions are very seldom ordered from the apothecary, but almost always are made a matter of domestic management, hence, a list of decoctions is omitted as unnecessary, an explanation of the general rules relative to them being deemed sufficient. The ordinary mode of preparing decoctions, among Eclectics, is to allow one ounce of the article used to one pint of water, and the dose of which is from one to four fluidounces, depending on the activity of the agent, or the physiological effect which is required. Where the proportions are different from these, it will be referred to in the description of the properties and uses of the article.

From various influences, decoctions are very liable to speedy change or decomposition; consequently they should be prepared only when required for use, and should not be kept, especially in warm weather, for a longer period than forty-eight hours.

EMPLASTRA.

Plasters.

Plasters are employed as external applications. They usually possess an amount of solidity requiring the aid of heat to spread them, and are adhesive at the usual temperature of the body.

In the formation of plasters, the application of too much or too long-continued heat must be sedulously avoided, lest decomposition of one or more of the articles entering into their composition ensues, or perhaps some volatile principle, necessary to their activity, be driven off. After the ingredients composing them have been properly combined, it is usual to form them into cylindrical rolls or long square sticks, and cover them with paper, so as to exclude the air, the action of which is apt to change their color, and render them hard and brittle; when this condition takes place, it may, in a great degree, be remedied by melting the plaster with a moderate heat, and then a sufficient quantity of oil to impart to it the proper consistence. Plasters should be neither too soft nor too hard; at ordinary temperatures they should be firm, should spread easily when moderately heated, and after being spread, should remain soft, pliable, and adhesive, without melting at the temperature of the body.

Plasters are spread upon various articles according to the particular purposes they are intended to fulfill; when they are to be applied to the

sound skin, leather is generally preferred; and when used as a dressing to ulcerated or abraded surfaces, or for the purposes of approximating and retaining in contact the sides of wounds, either linen or muslin are employed. Sometimes oil-silk or India-rubber cloth is employed, and where economy is desired, they are spread on stout paper. The leather generally used for spreading plasters is white sheep-skin. After having cut the leather to the required shape and size, the plaster is spread thinly and evenly upon it, leaving a margin from a quarter of an inch to half an inch uncovered, in order to prevent the edges from soiling the clothing which may come in contact with it, as well as to facilitate its removal. This margin is accurately obtained by pasting strips of paper along the edges of the leather, of the desired width, leaving a space of the required dimensions in the center, and then removing them after the spreading has been effected. Or the same object may frequently be accomplished by employing two narrow rules of sheet tin, graduated in inches, and so shaped that each of them may form two sides of a rectangle, being somewhat similar in shape to a carpenter's square, but much smaller. These may be applied so as to inclose any given rectangular space, and may be fixed upon the leather while spreading the plaster by means of weights. When other shapes are required, as in the instance for plasters on the breast, or behind the ears, pieces of tin, having a vacuity within corresponding to the required outline, may be employed. A plaster may be spread by means of a common spatula, but the most convenient method is by means of a peculiar iron instrument made expressly for the purpose. This is heated by means of a spirit lamp, care being taken that its temperature be not so elevated as to discolor or decompose the plaster, or drive off any of its volatile ingredients. A sufficient quantity of the plaster should be first melted by the heated instrument, and received on a piece of coarse, stiff paper, and, when nearly cool, should be transferred to the leather, and applied evenly over its extended surface. This method prevents the melted plaster from penetrating the leather, which it is apt to do when applied too hot. When linen or muslin is employed, and the plaster is to be of large dimensions, it is recommended to pass the cloth "on which the plaster has been laid, through a machine formed of a spatula fixed by screws at a proper distance from a plate of polished steel." When it is desired to obtain quantities of plasters, they are spread by a machine made for the purpose, for an account of which the reader is referred to "Pharmacy, by Mohr, Redwood and Procter."

Plasters are used for the purposes of affording mechanical support or pressure to the parts to which they are applied; for binding up wounds; for preventing atmospheric contact, and as anodyne, discutient, stimulant, or epispastic applications.

EMPLASTRUM BELLADONNÆ. *Plaster of Belladonna.*

Preparation.—Take of Extract of Belladonna *one ounce and a half*; Resin Plaster *three ounces*; place the plaster in an earthenware mortar, and put this in hot water. When the plaster commences to melt, add the Extract of Belladonna, and rub the ingredients well together. Then take the mortar from the water-bath, and continue the trituration till the mixture cools. Before the Belladonna is added to the plaster, it must first be brought into solution with water, so as to form a uniformly soft mass, and then while the evaporation of the water is going on, the mixture must be constantly stirred; without these precautions the extract cannot be made to diffuse uniformly through the plaster.

Properties and Uses.—This forms a useful anodyne application in rheumatic, neuralgic and syphilitic pains; and if too long used is apt to produce the constitutional effects of the belladonna.

EMPLASTRUM BELLADONNÆ COMPOSITUM. *Compound Plaster of Belladonna.*

Preparation.—Take of Resin Plaster *five ounces*; Extract of Belladonna *one ounce and a half*; Extract of Conium Maculatum *one ounce and a half*; Pulverized Iodine *two scruples*. Place the plaster in an earthenware mortar, and put this in hot water. When the plaster commences to melt, add the Extracts of Belladonna and Conium, and rub the ingredients well together; then take the mortar from the water-bath, continuing the trituration, and when nearly cool, add the Iodine.

N. B. The inspissated juices of the above narcotics are preferable to the ordinary extracts in preparing this plaster.

Properties and Uses.—This plaster may be used for the same purposes as the Belladonna Plaster, and is also an excellent application over scrofulous and other tumors, white-swelling, and goitre; and may likewise be applied over the region of the liver and spleen for chronic affections of these organs, and over the lumbar vertebræ in severe dysmenorrhea.—J. K.

EMPLASTRUM CAPSICI COMPOSITUM. *Compound Capsicum Plaster. Common Strengthening Plaster. Sear Cloth Plaster.*

Preparation.—Take of Rosin *one pound*; Beeswax *four ounces*; Capsicum *four ounces*; Spirit *one quart*. Simmer the pepper, inclosed in a linen bag, in the spirit for one hour, then strain. Melt the other articles together, and add the tincture; simmer till the spirit is nearly evaporated. Then take it from the fire, and when nearly cold, add Powdered Camphor *two ounces*; Oil of Sassafras *three drachms*. Stir till cold.

Properties and Uses.—This forms a gently stimulating and strengthening plaster, and may be used in all cases where artificial support, prevention of the contact of atmospheric air, or mild stimulation is required.

EMPLASTRUM EXTRACTI ACONITI RADICIS. *Plaster of Extract of Aconite Root.*

Preparation.—Take of Aconite Root, in coarse powder, *four ounces* ; alcohol, sp. gr. 0.835, *a sufficient quantity* ; Adhesive Plaster *three ounces and a half*. Moisten the powdered Aconite root with six ounces of Alcohol, and permit it to macerate twenty-four hours, then put it in a percolator, and when properly packed, pour on gradually sufficient Alcohol to make a pint of tincture. Distil off three-fourths of the Alcohol, evaporate the residue on a water-bath to a thick, syrupy consistence, then add the Plaster, previously liquefied, and stir constantly, until it is properly incorporated with the soft resinous extract, and cools.

History.—This formula is recommended by Wm. Procter, Jr., as superior to that in which only the *aconitia* enters, being more uniform in its strength and of equal efficacy. It has a brown color, and homogeneous consistence, and weighs about four Troy ounces. It should be spread in a thin layer on skin or oiled silk, and may be used several times when its application has not been too long continued at first.

Properties and Uses.—This extract is anodyne, and may be used as an application to painful and inflamed parts. It has been found decidedly beneficial in neuralgia of the head, and in painful tumors of the breast.

EMPLASTRUM MYRICÆ. *Bayberry Plaster. Green Salve.*

Preparation.—Take of White Gum Turpentine and Bayberry Wax, of each *half a pound*. Melt together, strain, and stir till cold. In winter a small quantity of Olive Oil may be added.

Properties and Uses.—This forms a very valuable and efficacious application to scrofulous and other ulcers, also to many cutaneous affections. It is often prepared of the consistence of an ointment for these purposes. See *Bayberry Ointment*.

EMPLASTRUM PICIS COMPOSITUM. *Compound Tar Plaster. Irritating Plaster.*

Preparation.—Boil Tar *three pounds*, for half an hour ; then add Burgundy Pitch *one pound and a half* ; White Gum Turpentine *one pound*, (having previously melted them together, and strained). Stir them together, remove from the fire, and add finely powdered Mandrake root, Blood root, Poke root, Indian Turnep, of each *ten ounces*. Incorporate well together.

Properties and Uses.—This plaster is irritant, rubefacient and suppurative. It is used extensively in all cases where counter-irritation or powerful revulsion is indicated, in neuralgia, rheumatism, and in all painful chronic diseases. It acts more efficiently, and is much more adhesive when spread quite thin, on soft leather, than when spread on any kind of cloth ; though it may be spread on oil-silk, india-rubber cloth, or other substance that will not absorb its moisture. When applied to a part of the body, it must be removed daily, for the purpose of thinly respreaading the same leather with the plaster, which is to be immediately reapplied. This course is to be continued until the surface to

which it is applied commences discharging matter, after which it should be removed two or three times a day, wiping it quite dry each time before respreading it, and likewise carefully drying the sore as much as possible. This latter is best accomplished by laying a dry, soft cloth upon the sore, pressing it down lightly for a few minutes, so as to absorb all the pus or matter. The practitioner must bear in mind that he is never, under any circumstances whatever, to wet the sore, as it will cause it to become irritable and inflamed, to cease suppurating healthily, and in the majority of instances, to require rapid healing.

Whenever the application of this plaster becomes so irritating and painful as to disturb the patient's sleep, or cause him to complain loudly, it must be removed, and a slippery elm poultice substituted; otherwise, its longer employment will be apt to aggravate the local disease for which it is applied. Many practitioners consider the disturbance of sleep alone, as an indication for its removal. As soon as the elm poultice has relieved all the local irritation, the plaster may be reapplied, if it is required to maintain the suppurative discharge for a longer period of time. If this is not required, the sore may be healed by some simple application, as an ointment made of beeswax and mutton tallow, which is, probably, better than any other, as it does not stop the discharge too suddenly; in some instances, the black-salve will be found an elegant healing application. Whenever the plaster, poultice, or healing application is removed, the sore should, each and every time, be cleansed from matter, in the manner referred to above. The active principles of the ingredients entering into the composition of this plaster, are, undoubtedly, absorbed into the system and exert an alterative influence, as their peculiar odors may be readily detected in the excretions. The Irritating Plaster is especially an Eclectic agent, not being used by the practitioners of other schools.—*T. V. M.*

EMPLASTRUM PLUMBI OXIDI RUBRUM. *Red Oxide of Lead Plaster. Black Salve.*

Preparation.—Take of Olive Oil *three quarts*; Rosin, Beeswax, of each *three ounces*. Melt together, and raise the mixture nearly to the boiling point; then gradually add Pulverized Red Lead *two pounds and a quarter*. Stir constantly, and when the lead is taken up by the oil, the mixture becomes brown, or a shining black; then remove from the fire, and when nearly cold add of Pulverized Camphor *half an ounce*. It should remain on the fire till it forms a proper consistence for spreading, and which may be known by dipping a spatula or knife into it from time to time, and allowing it to cool. In the preparation of this plaster, it must be remembered that the oil will require a heat of about 600° for ebullition; and should bubbles be observed when the heat is only 212°, it will probably be owing to the presence of water. If the oil, itself, is not brought to the boiling point, the red lead will not be acted upon;

hence, the operator should not add it until the oil has been so far heated as to scorch a feather when dipped into it.

Properties and Uses.—This is also another agent peculiar to Eclectic practice, and forms a valuable application in burns, many cutaneous affections, and in syphilitic, scrofulous, fistulous, and all other species of ulcers.

A preparation similar to the above is employed by many practitioners in preference; it is made as follows: Boil two quarts of linseed oil until it will scorch a feather, then gradually add one pound of red lead in powder, when the red lead is taken up by the oil, and the mixture is black, remove from the fire, and when nearly cold add two ounces of oil of turpentine, and stir until the mixture is cold.

EMPLASTRUM PLUMBI. *Lead Plaster. Litharge Plaster.*

Preparation.—Take of Semivitrified Oxide of Lead, in very fine powder, *five pounds*; Olive Oil *a gallon*; Water *two pints*. Boil them together over a gentle fire, stirring constantly until the oil and oxide of lead unite in a plaster. It will be proper to add a little boiling water, if that employed at the commencement be nearly all consumed before the end of the process.—*U. S.*

When the plaster is formed it should be removed from the fire, and after a short time cold water should be poured upon it; portions should then be detached from the mass, and, having been well kneaded under water, in order to separate the viscid liquid contained in the interior, should be formed into cylindrical rolls, and wrapped in paper.

History.—In the preparation of this plaster, there ensues a reaction between the oil and water, which gives rise to a sweetish substance, *glycerin*, and to the development of *oleic* and *margaric acids*, and, when animal fat is substituted for the olive oil, to a third acid, the *stearic*. The union of these acids with the oxide of lead, forms the plaster, which is a true oleo-margarate of lead. The glycerin becomes mixed with the plaster, or remains dissolved in the water. According to recent chemical views it is the *oxide of glyceryle* which exists in the oil, and which is developed with the fatty acids in the above process; this becomes glycerin by taking an equivalent of water. *Glyceryle* is a hypothetical compound of carbon and hydrogen, ($C_6 H_7$) and forms oxide of glyceryle on uniting with five equivalents of oxygen, ($C_6 H_7 O_5$), likewise a hypothetical compound, and with an additional equivalent of water it forms glycerin ($C_6 H_7 O_5 + HO$).

In preparing lead plaster it is very important that the oil employed be pure and free from rancidity, otherwise an imperfect product only will be obtained. A good plaster has been made by substituting lard for the oil, in the proportion of eight pounds of lard to five of litharge. The only oily matters which can be substituted for olive oil, are animal fats, and the only substitutes for the litharge are massicot, and minium, but

these require a much longer time to perfect the process, than when the officinal formula is followed. In making lead plaster first introduce the oil into a vessel capable of holding twice the quantity of oil used, and then by means of a fine sieve, sprinkle in the litharge, and constantly stir the mixture; this course prevents the oxide of lead from cohering in small masses, and allows the oil to easily penetrate it, thus facilitating the process. The water not only exerts an important agency chemically considered, but prevents too high a temperature, which would decompose the oil, and reduce the oxide to the metallic state. It must, therefore, be supplied by fresh additions of boiling water, from time to time, as directed in the formula; cold water would not only delay the process, but might cause a dangerous explosion. The articles should be constantly stirred during the process of boiling, and care taken to prevent the oxide from sinking to the bottom of the vessel; and as soon as the articles have completed their union the boiling should cease. This may be known by the litharge gradually becoming paler, until, when the process is complete, the mixture is nearly white. In the early part of the boiling the materials swell up considerably, owing partly to the evaporation of the water, and partly to the escape of carbonic acid gas, which is set free by the action of the oily acids upon carbonate of lead which is generally contained in greater or less quantity in the litharge. The consistence of the mass increases with the boiling, and toward its termination, or when the mass is sufficiently thick, a portion of it may be removed by means of a spatula, and cooled, when it will be found possessed of sufficient firmness not to adhere to the fingers. When perfected the plaster will present no red points of uncombined litharge; and should these exist they must be broken down by trituration, and the boiling continued until they have all disappeared. Too much heat must not be employed in the operation, lest the plaster become burned.

Properties and Uses.—This plaster is more commonly known by the name of *Diachylon*, and is chiefly used in the preparation of other plasters. It is likewise employed as an application to slight wounds, blistered and chafed surfaces, and occasionally to some ulcers, all of which it serves to protect from atmospheric influence. The sedative character of the lead entering into its formation, probably, assists its beneficial action.

An ointment is in considerable use as a dressing for burns, scalds, chilblains, and various cutaneous affections accompanied with a burning or smarting sensation. It is prepared as follows: Take of Lead Plaster *one pound and a half*; melt it by a gentle heat, and when melted, add to it, Oil of Turpentine *nine fluidounces*; Linseed Oil *three fluidounces*; Oil of Origanum *one pound*; Tincture of Opium *three fluidounces*. Stir the articles constantly until the mass has sufficiently cooled. This is applied by completely and thickly covering the affected part with the ointment, over which a layer of raw cotton is to be placed, and allowed

to remain until the part is well. In the case of deep burns, should the pain return after a few hours, the ointment should be removed, softening it with some warm oil, and a cataplasm of elm bark, or flaxseed, be applied. It is said to afford prompt relief.

EMPLASTRUM RESINÆ. *Resin Plaster. Adhesive Plaster.*

Preparation.—Take of Rosin *half a pound*; Lead Plaster *three pounds*. Melt the Lead Plaster over a gentle fire, add the Rosin, and mix them.—*U. S.*

History.—This preparation is the common adhesive plaster of the shops, and is usually spread upon muslin, by means of a machine made for the purpose. Long exposure to the air lessens its adhesiveness, in consequence of which the supply should be frequently renewed. Soap is sometimes added to the mixture, which increases its pliability without impairing its adhesiveness, beside lessening its liability to crack during cold weather. The following formula is stated to give an elegant plaster of this kind; take of Resin Plaster *three ounces*; Lead Plaster *thirteen drachms and a half*; Soap, sliced, *two drachms and a half*. Melt together and spread on linen.

Properties and Uses.—This is more stimulating than the lead plaster, and also more adhesive. It is generally employed for retaining the sides of wounds in contact, and likewise for dressing ulcers, drawing the edges toward each other, and giving a firm support to the granulations. The additions of turpentine or Burgundy pitch to it, are objectionable, as they increase its tendency to irritate, which should always be avoided as much as possible.

An adhesive plaster is prepared by Pettenkofer, which contains no oxide of lead; it is made by decomposing a solution of soap by means of a solution of chloride of calcium. The precipitate is expressed, dried, and powdered with half its weight of turpentine dried by heat; and the mixture is then melted along with an eighth part of suet, in boiling water. The boiling is continued, until the mass melts into a homogeneous fluid, when it is worked by the hand, in the ordinary manner, in cold water. Should portions of the above precipitate of calcareous soap not melt, they should be separated by straining through flannel.

EMPLASTRUM RESINÆ COMPOSITUM. *Compound Resin Plaster. Adhesive and Strengthening Plaster.*

Preparation.—Take of White Rosin *three pounds*; Beeswax *four ounces*; Burgundy Pitch *four ounces*; Mutton Tallow *four ounces*. Melt these together, and add, Olive Oil, Pulverized Camphor, and Sassafras Oil, of each *half an ounce*; West India Rum *four fluidounces*. Incorporate well together, and then pour the whole into cold water, and work it in the hands till cold, forming it into rolls or sticks.

Dr. W. P. Watrous, of Mount Sterling, Ky., prefers the following :— Melt together, Rosin *three pounds* ; Beeswax *four ounces* ; take from the fire, and when nearly cold add, gradually, Camphor *half an ounce*, dissolved in Oil of Hemlock, Oil of Sassafras, and Olive Oil, of each *one ounce*, Oil of Turpentine *half an ounce*. Work in water as above.

Properties and Uses.—This forms an adhesive and strengthening plaster useful in rheumatism, weakness of the joints, wounds, ulcers, etc. It is possessed of considerable stimulating property, and has been frequently used by Eclectic practitioners ; yet, notwithstanding, it is an unscientific preparation, as the Rum and Tallow will not be found to unite readily. The Emplastrum Capsici Compos. is a much better article to use for the same purposes. The formula of Dr. Watrous, will be found a good one, forming an elegant plaster.

ENEMATA.

Injections or Clysters.

Injections are liquid substances, sometimes containing powdered ingredients, and which are intended to be thrown into the rectum either for the purpose of effecting a speedy evacuation from the bowels, for producing the impression of a particular agent upon the inferior portion of the alimentary canal and the adjacent tissues and organs, or for effecting an influence generally upon the system, through the medium of the surface to which they are applied. They are also thrown into the vagina to aid in restoring the normal condition of its walls, to remove vaginal leucorrhea, to aid in the cure of excoriation or ulceration of the cervix, etc.

When thrown up the rectum, they are frequently employed to assist the action of remedies taken by the mouth, or to act as a substitute for them when the stomach rejects them, or is not susceptible to their influence, and are also used when the rectum or its vicinity is the seat of disease. As a general rule, about double the quantity of an agent may be used as an injection per rectum, as would be required to produce an effect when taken into the stomach ; yet with regard to very active remedies, this rule should be acted upon with caution. Again, it must be borne in mind that the impression of an agent upon the stomach may be very much diminished by its frequent use, while the rectum will continue to preserve its ordinary susceptibility to the action of such agent when used in enema.

When an evacuation of the bowels is designed, the quantity of fluid administered by injection, should be very large ; thus, for an adult, a pint or even a quart, may be employed, and which in some instances, as in bilious colic, will require a repetition of this quantity in the course of ten or fifteen minutes ; for a child from nine to twelve years of age,

half that quantity may be used; and for infants less than a year old, from one to three fluidounces.

When the peculiar impression of the remedy upon the parts, or upon the system generally is intended, it should be given in as little quantity of fluid as is compatible with its activity or character, and should be retained within the rectum as long as possible. Any immediate desire to discharge the injected fluid, should in all cases be resisted by the patient; and it may frequently be required on the part of the nurse or physician to aid its retention, by making a moderately firm pressure upon the fundament, with a warm compress of linen or muslin.

Injections are a very valuable mode of treatment in many diseases; indeed some affections cannot be readily nor permanently cured without them. They are found especially beneficial in bilious colic, in bilious, typhus, yellow, and congestive forms of fever, in dysentery and diarrhea, etc. In infants, life has often been preserved by their timely application; and the pains and dangers of the parturient woman, have frequently been very materially lessened by their use. And yet, notwithstanding their value and importance, there are hundreds of families, especially in country places, who do not supply themselves with the articles necessary for their administration, but who depend entirely upon the physician, or perhaps a neighbor, for the use of a syringe. This is a very reprehensible omission, and although not exactly within the province of this work, yet, from the evil results which I have seen depending upon a negligence of the above character, I cannot refrain from making a few brief advisory remarks. Every individual, and more especially every family, is liable to sickness which may require the use of a syringe, and to depend upon the physician for its supply is certainly bad policy, for very few, especially among those practicing in the country, furnish themselves with a quantity sufficient to meet the demands of the various families under their professional care; beside, very few physicians carry an article of this kind, and in some diseases, the delay occasioned by sending for it, may be death to the patient. No doubt, an immense number of patients, and more particularly among those residing in the country, die yearly solely from the want of an instrument with which to administer an injection. It is therefore a matter of duty with the practitioner, both to himself and to his patients, to strongly impress these facts upon those who patronize him professionally, and urge them by all means to make the necessary provision. A metallic syringe capable of holding a pint, and a smaller one of three or four fluidounces, should be found in the possession of every family, as these can be adapted to meet any emergency requiring their use.

Injections are emollient, stimulant, anodyne, purgative, antispasmodic, etc., and are most generally prescribed by the physician to suit the emergency of the case, without regard to officinal directions. For purposes of nutrition, as well as to reduce inflammation of the lower

intestines, infusions of starch, of elm bark, of flaxseed, and of corn meal, are usually injected into the rectum, with a portion of laudanum added when inflammation is present; and in cases where the stomach rejects all food and medicine, and when this condition is accompanied with prostration, a proper quantity of wine, brandy, or some similar stimulant may be added to the nutrient clyster, and repeated as often as the circumstances require. The following are among the agents of this class, in more common use.

ENEMA ALOËS COMPOSITA. *Compound Clyster of Aloes.*

Preparation.—Take of Aloes *two scruples*; Carbonate of Potassa *fifteen grains*; Tincture of Assafetida *three fluidrachms*; Infusion of Boneset *half a pint*. Mix, and rub them together.

Properties and Uses.—This is a stimulant, cathartic, and vermifuge clyster, and may be used with advantage in cases of ascarides in the rectum, and of amenorrhea attended with constipation.—*J. K.*

ENEMA ASSAFETIDÆ COMPOSITA. *Compound Clyster of Assafetida.*

Preparation.—Take of Mandrake root *two drachms*; Balmony *four drachms*; Water *half a pint*. Make a decoction, strain, and add to it Tincture of Assafetida *three fluidrachms*.

Properties and Uses.—This is used with children troubled with ascarides in the rectum. To a child two or three years old, about one half of the quantity may be used at a time, and repeated according to circumstances.—*J. K.*

ENEMA CATHARTICUM. *Cathartic Clyster.*

Preparation.—Take of Common Salt *half an ounce*, or *a tablespoonful*; Olive or Castor Oil *a fluidounce*, or *two tablespoonfuls*; Molasses *a fluidounce*; Warm Water *a pint*. Mix together.

Properties and Uses.—This is a very common laxative clyster, and possesses the advantage of consisting of materials which are always at hand in families. It is generally employed in cases of constipation, or where a speedy evacuation of the bowels is desired. An injection is sometimes used for the above purposes, and in diarrhea and dysentery, and, indeed, in almost every case where one is indicated, composed as follows: Take of Sweet Milk *half a pint*; Infusion of Elm Bark *half a pint*; Olive Oil *two fluidounces*; Molasses *four fluidounces*; Bicarbonate of Potassa *half an ounce*. Mix these articles together. When there are pains and gripings in the lower intestines, laudanum *half a fluidrachm*, may be added to each injection.

ENEMA CIMICIFUGÆ COMPOSITA. *Compound Clyster of Black Cohosh.*

Preparation.—Take of Black Cohosh root, in powder, *two ounces*; Cranesbill root, in powder, *two ounces*; Water *four pints*. Mix them together, make a decoction, and strain.

Properties and Uses.—This is an astringent preparation, combining with it a peculiar influence on the vaginal walls and cervix uteri, and is much employed in leucorrhœa, prolapsus uteri, relaxation of the vaginal walls, etc. It should be used with a female syringe, and repeated three or four times a day; the patient being placed in a recumbent position on her back, with the hips elevated, so as to retain the injection some ten or fifteen minutes, each time.—*T. V. M.*

ENEMA LOBELIÆ COMPOSITA. *Compound Clyster of Lobelia. Antispasmodic Clyster.*

Preparation.—Take of Water *half a fluidounce*; Compound Tincture of Lobelia and Capsicum *half a fluidrachm.* Mix together.

Properties and Uses.—This is a relaxant and antispasmodic clyster, and is used in cases of tetanus, convulsions, rigidity of the os uteri, and whenever its peculiar actions are indicated. The proportions as given in the above formula, are adapted to an infant from several weeks to a year old, laboring under an attack of convulsions; for adults, half a fluidounce, or even more of the tincture, may be added to a sufficient quantity of water; and so in proportion.

ENEMA OPII. *Clyster of Opium.*

Preparation.—Take of Decoction of Starch, or Infusion of Elm Bark *one fluidounce*, Tincture of Opium *twenty minims.* Mix them.

Properties and Uses.—This clyster is useful in obstinate vomiting, strangury from blisters, painful affections of the kidneys, bladder, and uterus, and in the tenesmus of dysentery. It should be retained in the rectum as long as possible, and may be repeated every one, two, or three hours, and in severe cases, even oftener, according to the urgency of the symptoms. If frequently employed it will produce the constitutional effects of the opium.

ENEMA SENNÆ COMPOSITA. *Compound Clyster of Senna.*

Preparation.—Take of Senna and Boneset, of each, *four ounces*; Boiling Water *one quart.* Pour the water on the herbs and macerate them by a moderate heat for about ten minutes; then strain, and add while yet hot, Molasses *four fluidounces*; Common Salt, and Powdered Lobelia Seed, of each *two drachms*; Powdered Bayberry Bark *two ounces*; Powdered Capsicum *two drachms.*

Properties and Uses.—This is one of the best clysters that can be used in bilious colic; it should be given as warm as the patient can bear, one-half the above quantity at a time, and may be repeated in fifteen minutes; of course, in connection with this, the internal administration of a decoction of Dioscorea Villosa, and local applications of cloths wet with hot water are to be employed.—*J. K.*

ENEMA TEREBINTHINÆ COMPOSITA. *Compound Clyster of Turpentine.*

Preparation.—Take of Castor Oil *half a fluidounce*; Oil of Turpentine *two fluidrachms*; Camphorated Tincture of Opium *one fluidrachm*. Mix together.

Properties and Uses.—This injection is principally employed in flatulency, and tympanitic tension of the abdomen, especially during an attack of peritonitis. It may be repeated two, three, or four times a day. It may likewise be used in ascarides, obstinate constipation, and amenorrhea.

ENEMA XANTHOXYLI. *Clyster of Prickly Ash.*

Preparation.—Take of Water *one fluidounce*; Tincture of Prickly Ash Berries *one fluidrachm*; Tincture of Opium *twenty minims*; mix together.

Properties and Uses.—This clyster will be found very beneficial in tympanitic distension of the abdomen from any cause. It will likewise be found efficacious in Asiatic cholera, and in diarrhea; in these last diseases it should be given and repeated immediately after each operation from the bowels, and should be retained in the rectum as long as possible. I have also used it with much benefit in the tympanitic abdomen of children, which so generally proves fatal, and which attends or follows an attack of diarrhea or summer complaint.—*J. K.*

EXTRACTA.

Extracts.

Extracts, in medicine, are solid or semi-fluid substances obtained by evaporation of the decoction, infusion, tincture, or juice of vegetable principles. The object in preparing them is to obtain as large an amount of the active principles of a remedy, with as little of its inert constituents as possible. Sometimes it becomes necessary to separate these active principles from each other, especially when their influences upon the system vary considerably; and this is generally accomplished by means of a menstruum which dissolves the principle required, leaving the others untouched. Extracts vary very much in their composition, and which is owing to the peculiar character of the remedies from which they are obtained, to the nature of the menstruum employed in dissolving their active principles, and to the process pursued for preparing them. The principles of plants most generally obtained by means of water, are gum, starch, sugar, tannin, extractive, coloring matter, various salts, together with certain principles peculiar to each plant; when alcohol is employed, resins, fatty matters, essential oil, and other principles not soluble in water are also obtained. And among these principles only such are selected as contain the active medicinal properties of the plant employed. The principles of plants are obtained either in a liquid state by expression of the plant, or by the agency of a proper solvent. When by expression, the plant must be fresh, cut into pieces, and bruised in

a stone mortar or mill, till brought to a pulpy consistence; and if it be not very succulent, a little water must be added to dilute the juice. The pulp is then introduced into a linen or canvas bag, and the liquid expressed. After filtering, it should be evaporated by a very gentle heat to the proper consistence. Should the juice hold in solution starch, or other inert principles which may be removed by heat without injuring its medicinal properties, it may be heated to about 160° previous to filtration, which will precipitate the inert substances. Extracts thus prepared are sometimes called *Inspissated Juices* (*Succi Spissati*). When obtained by solution, dried vegetable agents are commonly used, though occasionally they require to be recent, and the menstruum employed is either water, alcohol, or a mixture of the two, depending on the solubility of the active principles in these fluids, ether, or acetic acid. Extracts obtained by the agency of water, are called *Watery* or *Aqueous extracts*; those by means of alcohol, *Alcoholic extracts*; those in which both water and alcohol are employed, *Hydro-alcoholic extracts*; and those obtained by means of ether, *Ethereal extracts*. Wine and acetic acid as solvents, yield *vinous* and *acetic extracts*. In the preparation for an extract, the operator should previously acquaint himself with the nature of the principles contained in the drug, their solubility, their relations to heat and air, their volatility, etc., so that he may adopt the menstruum best calculated to remove the greatest amount of active matter, and control the evaporation, so that this may not be injured by heat, nor lost by volatilization.

In forming the solution for *aqueous extracts*, rain, river, or distilled water only should be used, and the vegetable should be thoroughly bruised, or reduced to the state of coarse powder; if too finely pulverized a precipitate of the inert or undissolved portions is apt to readily take place. Boiling water should then be poured on, and a gentle heat maintained for twenty or thirty minutes, according to the greater or less degree of solubility of the active principles, the vessel inclosing the articles being covered. Successive portions of water must be employed until the whole of the active matter is extracted. Filter the solutions, and evaporate in a sand or water-bath, until the proper consistence is attained. The evaporation should be conducted as quickly as the nature of the solution will admit, using a broad, shallow-dish, and toward the end of the process, it should be constantly stirred with a spatula. Long boiling, and even the boiling temperature, causes the decomposition of many vegetable principles, or at least so modifies them as to render them inert; it is, therefore, recommended to substitute for decoction, the process of *maceration* in which the liquid acts without heat, which may be employed where the matter is readily soluble in cold water; that of *digestion* in which the action of the liquid upon the vegetable principles is assisted by a moderately increased temperature, sustained for a length of time; or that of *infusion*, where the water is poured boiling hot upon

the plants, and allowed to stand for a short time in a covered vessel, and which is used where the virtues of the plant are not readily yielded to cold water. Long continued evaporation injures an extract more or less, hence it is always desirable to obtain the solution at first, as concentrated as possible, in order to avoid this result. And in those instances where successive portions of water are used, those which are the least impregnated should be evaporated first, and brought to the strength of the stronger solution before mixing them, so that the latter may not be exposed to unnecessary heat.

Alcoholic Extracts are made from tinctures of vegetables, the alcohol being either distilled off, or evaporated in the open air. *Hydro-alcoholic Extracts* should be prepared by exhausting the vegetable with each fluid separately, evaporate separately, and then combine the two extracts while hot. When the active principle of a plant is soluble in water, an Aqueous extract is commonly prepared; when it depends upon a resin, oil, or other substance insoluble in water, an Alcoholic extract is prepared; and a Hydro-alcoholic extract, when both of these liquids are required to take it up. And whatever mode may be employed in preparing the extract, occasional agitation or stirring, will always be required.

Ether is much employed in the preparation of extracts, and is especially adapted to those articles whose medicinal properties are contained in a volatile oil or resin, or in both combined. An Ethereal tincture is first prepared by displacement, and the ether is then distilled off at a very moderate heat, or allowed to escape by spontaneous evaporation. Mr. W. S. Merrell has invented an instrument, by means of which as the percolated tincture falls into the receiver, the ether is driven off to pass again through the articles, and thus continue until all their strength is exhausted; the whole process of tincturing and forming an extract being thus performed at the same time. These ethereal extracts are generally of a semifluid consistence.

In the preparation of extracts, the employment of "Smith's Patent Vapor Displacement Apparatus," or an apparatus upon a similar principle, is decidedly the best that can be used, both for obtaining all the active principles of plants in solution, and for procuring extracts of superior quality; and when largely manufactured, this apparatus cannot well be dispensed with. It is to the employment of an improved apparatus invented by himself, and embracing this principle, that the various syrups, extracts, etc., of our Pharmaceutist, William S. Merrell, owe their superiority to all others. Although Mr. Smith has patented this mode, yet we have understood that it was in operation many years ago, and is not a new discovery. In order to keep well, extracts should be placed in glass, stone, or porcelain jars, and completely protected from the access of the air; and the application of alcohol to the surface, while it does not injure the extract, has a tendency to prevent moldiness.

EXTRACTUM ACONITI ALCOHOLICUM. *Alcoholic Extract of Aconite.*

Preparation.—Take of Aconite Root, or recently dried Leaves, a pound; Diluted Alcohol four pints. Moisten the Aconite with half a pint of the Diluted Alcohol, and, having allowed it to stand for twenty-four hours, transfer it to an apparatus for displacement, and add gradually the remainder of the Diluted Alcohol. When the last portion of this shall have penetrated the Aconite, pour in sufficient Water from time to time to keep the powder covered. Cease to filter when the liquid which passes begins to produce a precipitate, as it falls, in that which has already passed. Distil off the Alcohol from the filtered liquor, and evaporate the residue to the proper consistence.—*U. S.*

History.—Care must be taken in the evaporation, that the heat be not greater than that produced by a vapor-bath, otherwise decomposition will be apt to ensue; a water-bath is preferable on this account, to heat directly applied. The addition of water in the latter part of the displacement, is for the purpose of expelling the spirituous solution which has been absorbed by the Aconite; and as a precipitate ensues as soon as the water passes off, the filtration is directed to cease as soon as the precipitate appears. When the process is properly performed, the extract procured is much better and more active than the inspissated juice; it is the only extract of this drug which should be used.

Properties and Uses.—Extract of Aconite possesses the properties of the plant in a powerful degree; it may be used in rheumatism, neuralgia, gout, scrofula, cutaneous diseases, inflammatory and febrile diseases, and in all cases in which the use of aconite is admissible. The dose is from half a grain to a grain, to be repeated two or three times a day, and gradually increased if necessary.

The extract prepared as above, from the root, is said to be more energetic than that from the leaves, and is to be given in doses of one-sixth or one-quarter of a grain, two or three times a day, and gradually increased.

EXTRACTUM ALETRIS ALCOHOLICUM. *Alcoholic Extract of Unicorn Root. Aletridin.*

Preparation.—Take of coarsely powdered Unicorn Root, two pounds; Alcohol, ninety per cent., a sufficient quantity. Moisten the Unicorn root with two pints of Alcohol, and let it stand twenty-four hours; then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without any taste of the root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the displacement apparatus, add gradually a sufficient quantity of Water, until the liquid passes but slightly impregnated with the properties of the Aletris. Heat the filtered liquid to the boiling point, strain, and evaporate by a gentle heat to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly until cold.

Properties and Uses.—This forms a very elegant and useful preparation of Unicorn Root. It may be used as a tonic in cases of debility of the digestive organs, and will be found valuable in uterine difficulties, as prolapsus, amenorrhea, dysmenorrhea, etc. The dose is from half a grain to two grains, three times a day.—*W. S. M.*

EXTRACTUM ANTHEMIDIS. *Extract of Chamomile.*

Preparation.—Take of Chamomile Flowers, bruised, *a pound*; Diluted Alcohol *a sufficient quantity*. Moisten the Chamomile Flowers with Diluted Alcohol, and let them stand twenty-four hours; then transfer to a percolator, and add gradually Diluted Alcohol until the liquid passes without the taste of the Chamomile. Distil off the Alcohol from the filtered liquor, and evaporate the residue to the proper consistence, by a heat below the boiling point.

Properties and Uses.—Extract of Chamomile is a tonic, and may be used in all cases where the crude article is indicated. It may be beneficially combined with other extracts, as of sculleap, cramp-bark, black-cohosh, golden-seal, ladies' slipper, etc. The dose is from one to five grains, three times a day.

EXTRACTUM APOCYNII HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Bitter Root.*

Preparation.—Take of coarsely powdered Bitter Root, (*Apocynum Cannabinum*), *two pounds*; Alcohol *a sufficient quantity*. Moisten the Bitter Root with two pints of Alcohol; let it stand twenty-four hours, and then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without the taste of the Root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the displacement apparatus, add gradually *a sufficient quantity* of Water, until the liquid passes but slightly impregnated with the properties of the Bitter Root. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly until cold.

Properties and Uses.—This extract is purgative, and, either alone or in combination with leptandrin, is much employed in affections of the liver and stomach, in intermittents and in the low stage of typhoid fevers. It has also been employed with advantage as a diuretic and emmenagogue. The dose is from one to ten grains, two or three times a day.—*W. S. M.*

EXTRACTUM ARCTII. *Extract of Burdock.*

Preparation.—Take of the Root of Burdock, in coarse powder or pieces, *a pound*; Water *a sufficient quantity*. Mix the root with a pint of the

Water, and after allowing the mixture to stand for twenty-four hours, introduce it into a displacement apparatus, and pour Water upon it gradually, until the liquid passes but slightly impregnated with the properties of the Burdock. Heat the filtered liquid to the boiling point, strain, and carefully evaporate to the proper consistence.

Properties and Uses.—Extract of Burdock is used principally as an alterative, in scrofula, syphilis, cutaneous affections, etc. The dose is from five to twenty grains, repeated three times a day.

EXTRACTUM ASCLEPIÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Pleurisy Root.*

Preparation.—Take of coarsely powdered Pleurisy Root *two pounds*; Alcohol *a sufficient quantity*. Moisten the Pleurisy Root with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without the taste of the root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence. To the powder in the displacement apparatus, add gradually *a sufficient quantity* of Water, until the liquid passes but slightly impregnated with the properties of the Pleurisy Root. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly till cold.

Properties and Uses.—Hydro-alcoholic Extract of Pleurisy Root is expectorant, tonic, laxative, and antispasmodic. It will be found useful in chronic and acute catarrhal coughs, rheumatic affections, dysentery, etc. From its peculiar action upon the ligaments of the uterus, it proves highly beneficial in prolapsus, and other displacements of this organ. The dose is from three to ten or fifteen grains three times a day.—

W. S. M.

EXTRACTUM BAPTISÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Wild Indigo.*

Preparation.—Take of the Bark of Wild Indigo Root, in coarse powder, *two pounds*; Alcohol *a sufficient quantity*. Moisten the Bark with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without the taste of the bark. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the displacement apparatus, add gradually *a sufficient quantity* of Water, until the liquid passes but slightly impregnated with the properties of the Wild Indigo Bark. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly till cold.

Properties and Uses.—This extract is antiseptic, with purgative and emetic properties when taken in large doses. It is especially advantageous in typhoid conditions of the system, in malignant ulcerations of the mouth and throat, in scarlatina, and in all cases where there is a tendency to putrescency or gangrene. It exerts a powerful stimulant effect on the glandular and nervous systems, and will be found useful in scrofula, obstinate hepatic torpor, etc. Its virtues are increased by combination with leptandrin, podophyllin, or cimicifugin. The dose is one-fourth of a grain gradually increased to one or two grains, and repeated three times a day.—*J. K.*

EXTRACTUM BELLADONNÆ ALCOHOLICUM. *Alcoholic Extract of Belladonna.*

Preparation.—Take of Belladonna Leaves, in coarse powder, *a pound*; Diluted Alcohol *four pints*. Moisten the Belladonna with half a pint of the Diluted Alcohol, and, having allowed it to stand for twenty-four hours, transfer it to a displacement apparatus, and add gradually the remainder of the Alcohol. When the last portion of this shall have penetrated the Belladonna, pour in sufficient Water from time to time to keep the powder covered. Cease to filter when the liquid which passes begins to produce a precipitate, as it falls, in that which has already passed. Distil off the Alcohol from the filtered liquor, and evaporate the residue to the proper consistence. (*See Alcoholic Extract of Aconite.*) The heat in the evaporation should not be greater than that produced by a vapor-bath, otherwise decomposition will be apt to ensue.

Properties and Uses.—This extract possesses all the virtues of Belladonna, *which see*, and is the most usual form of administration. The dose is from one-eighth of a grain to half a grain, or even a grain, to be repeated two or three times a day.

EXTRACTUM CAULOPHYLLI HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Blue Cohosh.*

Preparation.—Take of coarsely powdered Blue Cohosh Root *two pounds*; Alcohol *a sufficient quantity*. Moisten the Cohosh with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without the taste of the root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the displacement apparatus, add gradually *a sufficient quantity* of Water, until the liquid passes but slightly impregnated with the properties of the Cohosh. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly till cold.

Properties and Uses.—Hydro-alcoholic Extract of Blue Cohosh is antispasmodic and parturient. It may be advantageously combined with

dioscorein in bilious colic, flatulency, and griping pains arising from the use of drastic purgatives; with xanthoxylin, hydro-alcoholic extracts of cimicifuga, or scutellaria, in rheumatic affections; and with senecin, cimicifugin, aletridin, asclepidin, or extract of cramp bark in uterine diseases. It will be found very useful in amenorrhea and dysmenorrhea; and forms with hydrastin an elegant remedy for deranged conditions of the stomach, dyspepsia, etc. It has also been found serviceable in after-pains. The dose is from one to five grains, three times a day.—*J. K.*

EXTRACTUM CIMICIFUGÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Black Cohosh.*

Preparation.—Take of Black Cohosh Root, in moderately fine powder, *two pounds*; Alcohol *a sufficient quantity*. Moisten the Cohosh with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add alcohol until it passes off without the taste of the root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the displacement apparatus add gradually *a sufficient quantity* of Water, until the liquid passes off but slightly impregnated with the properties of the Cohosh. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly till cold.

Properties and Uses.—Hydro-alcoholic Extract of Black Cohosh possesses all the virtues of the root, and in nervous derangements, as chorea, epilepsy, etc., is much superior to the cimicifugin in action and efficacy; it is decidedly more narcotic and antispasmodic than this resinoid. I make extensive and successful use of it in epilepsy, chorea, delirium tremens (in which I combine it with quinia), nervous excitability, and many spasmodic affections. Persons subject to cramps will be speedily and permanently relieved by the employment of this extract combined with the extract of cramp bark. The hydro-alcoholic extract of black cohosh may be used in all instances where the employment of the root is indicated. The dose is from one to five or ten grains, three times a day.—*J. K.*

EXTRACTUM COLOCYNTHIDIS. *Extract of Colocynth.*

Preparation.—Take of Colocynth, sliced and deprived of its seeds, *three pounds*; Diluted Alcohol *half a gallon*. Macerate the Colocynth in the Diluted Alcohol for thirty-six hours, occasionally pressing it with the hand. Express the liquor strongly and strain. Finally, evaporate to the proper consistence.

Properties and Uses.—This extract is cathartic, and may be used in the dose of from five to thirty grains.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM. *Compound Extract of Colocynth.*

Preparation.—Take of Colocynth, deprived of the seeds and sliced, *six ounces*; Aloes, in powder, *twelve ounces*; Scammony, in powder, *four ounces*; Cardamom, in powder, *two ounces*; Castile Soap *three ounces*; Diluted Alcohol *a gallon*. Macerate the Colocynth in the Diluted Alcohol, with a gentle heat, for four days. Express and filter the liquor, and add to it the Aloes, Scammony and Soap; then evaporate to the proper consistence, and, near the end of the process, mix the Cardamom with the other ingredients.

History.—Diluted Alcohol is a much better solvent of colocynth than water, hence it is directed in the above formula. The soap is added to improve the consistence of the extract, to render it more soluble in the fluids of the stomach, and to qualify the irritating action of the aloes and scammony. By exposing thin layers of this extract to dry air for a few days, it will be evaporated to dryness, in which state it may be powdered for admixture with other substances.

Properties and Uses.—Compound Extract of Colocynth is an active cathartic, and may be employed in all cases where catharsis is indicated. From the difficulty with which pure scammony can be obtained in this country, I would suggest as a substitute for it, in the above formula, Podophyllin, in powder, *two ounces*, and which will by no means lessen the value or efficacy of the preparation. This extract may be especially used in obstinate constipation, and congestion of the liver or portal system. The dose is from five to thirty grains.

EXTRACTUM CONII ALCOHOLICUM. *Alcoholic Extract of Poison Hemlock.*

Preparation.—Take of the recently dried and coarsely powdered Leaves of Conium Maculatum *half a pound*; Diluted Alcohol *four pints*. Moisten the Leaves with half a pint of the Diluted Alcohol, and having allowed the mixture to stand for twenty-four hours, transfer it to a percolator, and add gradually the remainder of the Diluted Alcohol. When the last portion of this shall have penetrated the powder, pour in sufficient water from time to time to keep the mass covered. Cease to filter when the liquid which passes begins to produce a precipitate, as it falls, in that which has already passed. Distil off the Alcohol from the filtered liquor, and evaporate the residue to the proper consistence. (*See Alcoholic Extract of Aconite.*) The heat in the preparation of this extract must be very moderate, or decomposition will ensue.

Properties and Uses.—This extract is narcotic, and may be used in all cases where its peculiar influence is desired. The dose is from one-eighth of a grain, to one, two, or three grains, two or three times a day.

EXTRACTUM CORNUS FLORIDÆ. *Extract of Dogwood.*

Preparation.—Take of Dogwood Bark, in coarse powder, *a pound*; Water *a sufficient quantity*. Mix the Bark with a pint of the Water, and, after allowing the mixture to stand for twenty-four hours, introduce it

into a displacement apparatus, and pour Water upon it gradually until the liquid passes but slightly impregnated with the properties of the Dogwood. Heat the filtered liquid to the boiling point, strain, and carefully evaporate to the proper consistence.

Properties and Uses.—Extract of Dogwood is tonic and antiperiodic, and may be used as a substitute for quinia, in all cases. It will be found useful in dyspepsia, debility of the stomach, and as a tonic in dropsical affections after the water has been evacuated. The dose is from one to five grains, three times a day.

EXTRACTUM CORYDALIS HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Turkey Corn.*

Preparation.—Take of the coarsely powdered Root of Turkey Corn two pounds; Alcohol a sufficient quantity. Moisten the powdered Root, with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without the taste of the root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the displacement apparatus, add gradually a sufficient quantity of Water, until the liquid passes but slightly impregnated with the properties of the Corydallis. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly till cold.

Properties and Uses.—This extract is tonic and alterative, and may be employed in all cases where tonics are indicated. It is useful in all scrofulous affections; and in syphilitic diseases, both primary and secondary, it will be found among our most efficient agents. The dose is from one to five grains, three times a day.—*J. K.*

EXTRACTUM CYPRIPEDEII HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Yellow Ladies' Slipper.*

Preparation.—Take of coarsely powdered Yellow Ladies' Slipper Root two pounds; Alcohol a sufficient quantity. Moisten the Root with two pints of Alcohol; let it stand twenty-four hours, then transfer it to a percolator, and gradually add Alcohol until it passes off without the taste of the root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the percolator, add gradually a sufficient quantity of Water, until the liquid passes off but slightly impregnated with the properties of the Cypripedium. Heat the filtered liquid to nearly the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly till cold.

Properties and Uses.—This extract is tonic and antispasmodic, and may be used to fulfill all the indications of the crude root in hysteria, chorea, nervous headache, and nervous irritability. It may be combined with the Hydro-alcoholic Extract of Sculleap, in many cases advantageously. Its dose is from one to five grains, two or three times a day.—*W. S. M.*

EXTRACTUM DULCAMARA. *Extract of Bittersweet.*

Preparation.—Take of Bark of the Root, and Twigs of Solanum Dulcamara a pound; Water a sufficient quantity. Mix the Dulcamara with a pint of the Water, and after allowing the mixture to stand for twenty-four hours, introduce it into a displacement apparatus, and pour Water upon it gradually until the liquid passes but slightly impregnated with the properties of the Dulcamara. Heat the filtered liquid to the boiling point, strain, and carefully evaporate to the proper consistence.

Properties and Uses.—The Extract of Bittersweet possesses the active properties of the plant, and may be beneficially employed in scrofula, syphilis, cutaneous diseases, and wherever the plant is indicated. The dose is from two to ten grains, three times a day.

EXTRACTUM EUPATORII. *Extract of Boneset.*

Preparation.—Take of the Tops and Leaves of Boneset a pound; Water a sufficient quantity. Mix the Boneset with a pint of the Water, and after allowing the mixture to stand for twenty-four hours, introduce it into a percolator, and pour Water upon it gradually until the liquid passes but slightly impregnated with the properties of the Boneset. Heat the filtered liquid to the boiling point, strain, and carefully evaporate to the proper consistence.

Properties and Uses.—Extract of Boneset is tonic and aperient, and may be given with advantage in convalescence from exhausting diseases, intermittent fever, dyspepsia, debility of the digestive organs, and general debility. The dose is from one to ten grains, two or three times a day.

EXTRACTUM GENTIANÆ. *Extract of Gentian.*

Preparation.—Take of Gentian, in coarse powder, a pound; Water a sufficient quantity. Mix the Gentian with a pint of Water, and, after allowing the mixture to stand for twenty-four hours, introduce it into a displacement apparatus, and pour Water upon it gradually until the liquid passes but slightly impregnated with the properties of the Gentian.

History.—Extract of Gentian is of a shining dark-brown color, nearly black, inodorous, very bitter, and tenacious.

Properties and Uses.—This extract is a tonic, and may be used wherever this indication is present, either alone or in conjunction with other tonics. The dose is from one to ten grains.

EXTRACTUM GOSSYPII. *Extract of Cotton Bark.*

Preparation.—Take of the inner Bark of the Root of the Cotton Plant, in coarse powder, *a pound*; Water *a sufficient quantity*. Mix the Bark with a pint of the Water, and after allowing the mixture to stand for twenty-four hours, introduce it into a displacement apparatus, and pour Water upon it gradually until the liquid passes but slightly impregnated with the properties of the Cotton Bark. Filter the liquid, and heat it to the boiling point, strain, and carefully evaporate to the proper consistence.

Properties and Uses.—Extract of Cotton Bark is emmenagogue and abortivant. It will be found useful in amenorrhea and dysmenorrhea, combined with belladonna and quinia. The dose is from one to five or ten grains, three times a day.—*J. K.*

EXTRACTUM HÆMATOXYLI. *Extract of Logwood.*

Preparation.—Take of Logwood, rasped, *a pound*; Water *a gallon*. Boil down to four pints, and strain the liquor while hot; then evaporate to the proper consistence.

History.—The evaporation of this extract should be carried to the extent of making it dry and brittle when cold. One hundred weight of logwood is said to yield about twenty pounds of extract. It is of a deep red color, and a sweetish astringent taste, and if made into pills and kept any length of time, it becomes so hard that the pills pass through the bowels unchanged.

Properties and Uses.—Extract of Logwood is astringent and tonic, and will be found useful in diarrhea, dysentery, relaxed conditions of the bowels succeeding cholera infantum, and in chronic laryngitis or bronchitis accompanied with considerable mucous expectoration. The dose is from five to thirty grains, two or three times a day.

EXTRACTUM HELENII HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Elecampane.*

Preparation.—Take of coarsely powdered Elecampane Root *two pounds*; Alcohol *a sufficient quantity*. Moisten the Root with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a percolator, and gradually add Alcohol until it passes off without the taste of the root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence. To the powder in the percolator, add gradually *a sufficient quantity* of Water, until the liquid passes but slightly impregnated with the properties of the Elecampane. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly till cold.

Properties and Uses.—This extract is stimulant and tonic, and is very useful in chronic pulmonary affections, debility of the digestive organs,

torpor of the liver, dyspepsia, and chronic cough. The dose is from one to ten grains, three times a day.—*W. S. M.*

EXTRACTUM HYDRASTIS HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Golden Seal.*

Preparation.—Take of the Root of Golden Seal, in powder, *two pounds*; Alcohol *a sufficient quantity*. Moisten the powdered Root with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a percolator, and gradually add Alcohol until it passes off without the taste of the Root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the percolator, add gradually *a sufficient quantity* of Water, until the liquid passes but slightly impregnated with the properties of the Golden Seal. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly till cold.

Properties and Uses.—This extract possesses all the tonic virtues of the root, and may be used in all cases where that is indicated. In many instances it will be preferable to hydrastin, on account of the insolubility of the latter. The dose is from two to five grains, three times a day.—*J. K.*

EXTRACTUM HYOSCYAMI ALCOHOLICUM. *Alcoholic Extract of Henbane.*

Preparation.—Take of recently dried Henbane Leaves, in coarse powder, *a pound*; Diluted Alcohol *four pints*. Moisten the Henbane with half a pint of the Diluted Alcohol, and, having allowed it to stand for twenty-four hours, transfer it to a percolator, and add gradually the remainder of the Diluted Alcohol. When the last portion of this shall have penetrated the Henbane, pour in sufficient water from time to time to keep the powder covered. Cease to filter when the liquid which passes begins to produce a precipitate, as it falls, in that which has already passed. Distil off the Alcohol from the filtered liquor, and evaporate the residue to the proper consistence. The heat in the evaporation should not be greater than that produced by a vapor-bath, otherwise decomposition will be apt to ensue. (*See Alcoholic Extract of Aconite.*)

Properties and Uses.—This extract contains all the medicinal virtues of the Henbane, and may be administered whenever this drug is indicated. The dose is from one-fourth of a grain, to two or three grains, three times a day. The smallest dose must first be given, and the quantity gradually increased until the desired influence is obtained.

EXTRACTUM IRIDIS HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Blue Flag.*

Preparation.—Take of the coarsely powdered Root of Iris Versicolor *two pounds*; Alcohol *a sufficient quantity*. Moisten the Blue Flag with

two pints of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without the taste of the Root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the displacement apparatus, add gradually *sufficient* Water until the liquid passes but slightly impregnated with the properties of the Blue Flag. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly till cold.

Properties and Uses.—The Hydro-alcoholic Extract of Blue Flag is a valuable cathartic and alterative. In doses of from one to five grains or more, it will be found a useful purgative in cases of obstinate constipation, hepatic torpor, indigestion, amenorrhea, etc. In larger doses it will produce hydragogue results, and may be given with advantage in chronic pulmonary affections, dropsy, worms, etc. In doses, to fall short of catharsis, it becomes a valuable alterative, and will be found especially useful in rheumatic diseases, scrofula, syphilis, etc., and will frequently cause ptyalism. A few grains of ginger or capsicum will prevent any harshness of action. As an alterative, the dose is from one-fourth of a grain to one grain, three times a day.—*J. K.*

EXTRACTUM *sive* RESINA JALAPÆ. *Extract or Resin of Jalap.*

Preparation.—Take of Jalap, in moderately fine powder, *two pounds*; mix it thoroughly with a sufficient quantity of Rectified Spirit to moisten it well, let it stand twenty-four hours, and then transfer it to a percolator, and gradually add Rectified Spirits until it passes off without any of the taste of the Jalap. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue over a vapor-bath, to the proper consistence.

History.—This resin is dark-colored, brittle and of a shining fracture; and is sufficiently pure for practical purposes. The pure resin of jalap is white as flour, and is an active cathartic in doses of from three to five grains. Jalap resin may, according to G. A. Kaiser, be known from all other resins by its gradual solution in concentrated sulphuric acid, and subsequent deposition of a brown, soft, viscid matter, on standing for a few hours. Guaiacum resin is frequently added to it; this fraud may be detected by making an alcoholic solution of the suspected resin, and adding to it a few drops of chloride of soda, or of lime; if guaiac be present, it produces a green color.

Properties and Uses.—The purgative principle of Jalap depends entirely on its resin, and its diuretic properties on its gummy extractive. The resin prepared as above is an active cathartic in the doses of from

four to ten grains, with much pain and griping, but which may be obviated by trituration with Castile soap, caulophyllin, or loaf sugar.

EXTRACTUM JUGLANDIS. *Extract of Butternut.*

Preparation.—Take of the Inner Bark of the Root of Juglans Cinerea a pound; Diluted Alcohol a sufficient quantity. Mix the Bark with a pint of the Diluted Alcohol, and after allowing the mixture to stand for twenty-four hours, introduce it into a displacement apparatus, and pour diluted Alcohol upon it gradually until the liquid passes but slightly impregnated with the properties of the Butternut. Heat the filtered liquid to the boiling point, strain, and carefully evaporate to the proper consistence.

History.—Extract of Butternut is of a black color, sweetish odor, and bitter, astringent taste. The extract prepared by the country people is of an inferior kind, and should never be purchased by the apothecary. It is usually made with water, which does not extract all the medicinal virtue of the bark, and is likewise apt to be more or less injured by the improper application of heat. Hence, many practitioners, having used the country prepared extract, and found it uncertain in its effects, decry all other extracts. In preparing the extract, the bark of the root should be collected in May or June, and used while fresh.

Properties and Uses.—A mild cathartic, acting upon the bowels without disposing them to subsequent constipation. The dose is from ten to thirty grains.

EXTRACTUM KRAMERIE. *Extract of Rhatany.*

Preparation.—Take of the Bark of Rhatany Root, in moderately fine powder, a pound; Water a sufficient quantity. Mix the Bark of the Root with a pint of the Water, and after allowing the mixture to stand for twenty-four hours, introduce it into a displacement apparatus, and pour Water upon it gradually until the liquid passes but slightly impregnated with the properties of the Rhatany. Rapidly evaporate the filtered liquid to such a consistence, that when cold the extract may be dry.

History.—Good Extract of Rhatany is of a reddish-brown color, with a smooth, shining fracture, very astringent taste, and is almost completely soluble in water. In the above formula for preparing this extract, the evaporation should be conducted rapidly, or in a vacuum, because, when the infusion is exposed for a length of time to the action of the air, there is an absorption of oxygen, and the production of insoluble apotheme. The extract made by alcohol, or by decoction, is inferior to that made by the above process; the former containing from twenty to thirty per cent. less of the active principle than the officinal, and the latter containing nearly fifty per cent. of insoluble matter. By the formula given, the wood of the root yields 6.8 per cent. of extract, and the bark 33 per cent. Much of the Extract of Rhatany found in the shops is of an inferior quality.

Properties and Uses.—Extract of Rhatany may be used whenever an astringent is required; in some cases it will be found preferable to any other agent of this class. The soft extract may be advantageously used as a local application to ulcers, hemorrhoids, and fissures of the anus. The dose is from five to twenty grains, three or four times a day.

EXTRACTUM LEONURI HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Motherwort.*

Preparation.—Take of the recently dried herb Leonurus Cardiaca, in coarse powder, *two pounds*; Alcohol *a sufficient quantity*. Moisten the Motherwort with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a percolator, and gradually add Alcohol until it passes off without the taste of the herb. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence, by means of a very moderate heat.

To the powder in the displacement apparatus, add gradually *a sufficient quantity* of Water, until the liquid passes but slightly impregnated with the properties of the Motherwort. Heat the filtered liquid to nearly the boiling point, strain, and carefully evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly till cold.

Properties and Uses.—Extract of Motherwort is emmenagogue, nervine, and antispasmodic, and may be used with advantage in all forms of disease in which the cold infusion of the herb is recommended. The dose is from three to six grains, every two or four hours. It may be advantageously combined with asclepidin, or the hydro-alcoholic extracts of black cohosh, nerve-root, cramp-bark, scullcap, etc.—*W. S. M.*

EXTRACTUM LEPTANDRÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Blackroot.*

Preparation.—Take of the recently dried root of Leptandra Virginica, in coarse powder, *two pounds*; Alcohol *a sufficient quantity*. Moisten the Blackroot with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without the taste of the root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the percolator, add gradually *a sufficient quantity* of Water, until the liquid passes but slightly impregnated with the properties of the Blackroot. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly till cold.

Properties and Uses.—This extract possesses all the medicinal properties of the Blackroot, and may be used wherever that is indicated. The

dose is from one to ten grains. It may be beneficially combined with the hydro-alcoholic extract of Wild Indigo, in typhoid diseases, and where an action upon the liver is desired without active catharsis.

EXTRACTUM LUPULINÆ. *Extract of Lupulin.*

Preparation.—Take of Commercial Lupulin *four ounces*; Alcohol *eight fluidounces*. Place the Lupulin loosely in a percolator, cover with Alcohol, and allow it to stand an hour. Then gradually add Alcohol until two pints of filtered liquor are obtained. Pour this liquor in a shallow dish and set aside to evaporate spontaneously.

History.—Commercial lupulin is more or less mixed with hops, and consequently varies in its activity. The above extract contains the medicinal principles of the hops unimpaired, is of uniform strength, and is in a form convenient for pills. In making larger quantities of extract, it would be economical to distil off about three-fourths of the alcohol, previous to spontaneous evaporation. Commercial lupulin yields about two scruples of extract to a drachm of the grains.

Properties and Uses.—This extract possesses the active properties of the hops in an eminent degree, and may be used in all cases where lupulin is admissible. The dose is from two to ten grains three times a day.

EXTRACTUM MITCHELLÆ. *Extract of Partridge Berry.*

Preparation.—Take of the recently dried herb Mitchella Repens, in coarse powder, *a pound*; Water *a sufficient quantity*. Mix the herb with a pint of the Water, and after allowing the mixture to stand for twenty-four hours, introduce it into a displacement apparatus, and pour Water upon it gradually until the liquid passes but slightly impregnated with the properties of the plant. Heat the filtered liquid to the boiling point, strain, and carefully evaporate to the proper consistence.

Properties and Uses.—This extract is an invaluable preparation, and possesses the active medicinal virtues of the plant. It is employed more especially on account of its tonic influence upon the uterus; and in diseases of this organ, it may be usefully combined with cimicifugin, caulophyllin, aletridin, senecin, etc. The dose is from one to ten grains three times a day.—*J. K.*

EXTRACTUM NUCIS VOMICÆ ALCOHOLICUM. *Alcoholic Extract of Nux Vomica.*

Preparation.—Take of Nux Vomica *a pound*; Alcohol *a sufficient quantity*. Expose the Nux Vomica to steam till it is softened; then having sliced and dried it, grind it into powder. Introduce it into a displacement apparatus, and pour Alcohol upon it gradually, until the liquid passes without bitterness. Distil off the greater part of the Alcohol from the filtered liquor, and evaporate the residue to the proper consistence.

Properties and Uses.—This is an active preparation of nux vomica, but owing to the variable proportion of strychnia in the seeds, it is not always of uniform strength. It may be employed in cases where the action of this agent is required. It is very useful in cases of obstinate constipation, and may be employed in the following combination: Take Extract of Butternut *two grains*; Podophyllin *one sixteenth of a grain*; and Alcoholic Extract of Nux Vomica *one-fourth of a grain*; mix thoroughly together and form a pill, which is a dose, and may be repeated two or three times daily, or until the desired effect is produced. The dose of the above extract of nux vomica is from one-fourth of a grain to two grains, repeated two or three times a day.

EXTRACTUM PHYTOLACCÆ ALCOHOLICUM. *Alcoholic Extract of Poke.*

Preparation.—Take of the recently dried Leaves of Poke, in coarse powder, *a pound*; Diluted Alcohol *four pints*. Moisten the leaves with half a pint of the Diluted Alcohol, and having allowed it to stand for twenty-four hours, transfer it to a displacement apparatus, and add gradually the remainder of the Diluted Alcohol. When the last portion of this shall have penetrated the Poke, pour in sufficient water from time to time to keep the powder covered. Cease to filter when the liquid which passes begins to produce a precipitate, as it falls, in that which has already passed. Distil off the Alcohol from the filtered liquor, and evaporate the residue to the proper consistence, by means of a gentle heat. (*See Alcoholic Extract of Aconite.*)

History—Extract of Poke prepared in this manner, is superior to that prepared in the ordinary way with water. The leaves employed in the preparation of the extract should be gathered immediately previous to the ripening of the berries, at which period they are the most active. An extract may be prepared from the Poke-root in the same manner, but it is somewhat doubtful whether it is as energetic as that from the leaves. An extract formed by evaporating the expressed juice of the recent ripe berries is frequently employed, but it is presumed to be inferior in point of efficacy to that from the leaves.

Properties and Uses.—These various extracts of Poke, are emetic and purgative in large doses; in medicinal doses they are alterative and are especially useful in syphilitic, mercurio-syphilitic, and rheumatic diseases, and particularly in the osteocopic pains of mercurio-syphilis. They lose their virtues by age, and should be freshly prepared every year. The dose is from one to five grains, or more, three times a day.

The inspissated juice of Poke-berries, (*Succus Inspissatus Phytolaccae, Baccæ*), is frequently employed as a valuable agent in rheumatism; it is milder than the extract prepared from the root, or leaves.

EXTRACTUM PLANTAGINIS CORDATÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Water Plantain.*

Preparation.—Take of the recently dried Root of Water Plantain, in coarse powder, *two pounds*; Alcohol *a sufficient quantity*. Moisten the

Root with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without the taste of the root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence. To the powder in the percolator, add gradually a *sufficient quantity* of Water, until the liquid passes but slightly impregnated with the properties of the Water Plantain root. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly until cold.

Properties and Uses.—Hydro-alcoholic Extract of Water Plantain is astringent, and has been used with much success in Asiatic cholera, diarrhea, and dysentery. The dose is from one to ten grains, repeated every one, two, or three hours, as the urgency of the case requires.—*W. S. M.*

EXTRACTUM POLYGONI. *Extract of Water Pepper.*

Preparation.—Take of the recently dried herb of Water Pepper, in coarse powder, *a pound*; Water *a sufficient quantity*. Mix the herb with a pint of the Water, and after allowing the mixture to stand for twenty-four hours, introduce it into a percolator, and pour Water upon it gradually until the liquid passes but slightly impregnated with the properties of the Water Pepper. Heat the filtered liquid to the boiling point, strain, and carefully evaporate to the proper consistence.

Properties and Uses.—Extract of Water Pepper is stimulant, diuretic, and emmenagogue, and is especially useful in amenorrhea, and chronic affections of the kidneys. The dose is from two to ten grains, three or four times a day.

EXTRACTUM PTELEÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Shrubby Trefoil.*

Preparation.—Take of the recently dried Bark of the Root of Ptelea Trifoliata, in coarse powder, *two pounds*; Alcohol *a sufficient quantity*. Moisten the Bark with two pints of Alcohol, let it stand for twenty-four hours, then transfer it to a percolator, and gradually add Alcohol until it passes off without the taste of the bark. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the percolator, add gradually a *sufficient quantity* of Water until the liquid passes but slightly impregnated with the properties of the Ptelea. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly until cold.

Properties and Uses.—This extract is an elegant preparation, and may be used in all cases where the Ptelea is indicated. Its use is at the

present time superseded by that of the Ptelein. The dose is from two to ten grains.—*W. S. M.*

EXTRACTUM RHEI. *Extract of Rhubarb.*

Preparation.—Take of Rhubarb, in coarse powder, *a pound*; Diluted Alcohol *a sufficient quantity*. Mix the Rhubarb with an equal quantity of coarse sand, moisten it thoroughly with Diluted Alcohol, and allow it to stand for twenty-four hours; then transfer it to a displacement apparatus, and add Diluted Alcohol gradually until four pints of filtered liquor are obtained. Evaporate this to the proper consistence by means of a water-bath.—*U. S.*

History.—As the purgative principle of rhubarb is injured to a greater or less extent by heat, the above process must be performed with much care, employing only a moderate degree of heat. When the drug is boiled in water, the tannin and starch, which form a part of its composition, combine and give rise to a compound insoluble in cold water, and which, probably carries with it a portion of the purgative principle. It is supposed, also, that this principle is volatilizable by heat, and that a portion of it escapes with the vapor.

Properties and Uses.—Extract of Rhubarb possesses virtues similar to the drug itself, and has the advantage of smallness of dose, and its capability of being given in solution. The dose is from ten to thirty grains.

EXTRACTUM RUMECIS HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Yellow Dock.*

Preparation.—Take of coarsely powdered Yellow Dock Root *two pounds*; Alcohol *a sufficient quantity*. Moisten the Yellow Dock Root with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without the taste of the root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the percolator, add gradually *a sufficient quantity* of Water until the liquid passes but slightly impregnated with the properties of the Yellow Dock. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly until cold.

Properties and Uses.—This extract is tonic and alterative, and is efficacious in scrofula, and cutaneous diseases. It is most generally given in combination with some other alterative, as extract of Poke, Cimicifuga, Dulcamara, Corydalis, etc. The dose is from one to five grains, three times a day.—*W. S. M.*

EXTRACTUM SANGUINARIÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Bloodroot.*

Preparation.—Take of coarsely powdered Bloodroot *two pounds*;

Alcohol *a sufficient quantity*. Moisten the Bloodroot with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without the taste of the root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence. To the powder in the displacement apparatus, add gradually *a sufficient quantity* of Water, until the liquid passes but slightly impregnated with the properties of the Cohosh; then evaporate the filtered liquid to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot and stir constantly.

Properties and Uses.—This preparation of Bloodroot is expectorant, alterative, and emmenagogue, and may be used with benefit in pulmonary and hepatic diseases, jaundice, and amenorrhea. Externally, it forms a mild caustic, and may be advantageously applied to indolent ulcers and fistula-in-ano. It possesses the virtues of the root. The dose is from one-eighth of a grain to a grain.—*J. K.*

EXTRACTUM SCUTELLARIE HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Scullcap.*

Preparation.—Take of the recently dried Herb, Scullcap, in coarse powder, *two pounds*; Alcohol *a sufficient quantity*. Moisten the Scullcap with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without the taste of the root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the displacement apparatus, add gradually *a sufficient quantity* of Water, until the liquid passes but slightly impregnated with the properties of the Scullcap. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly until cold.

Properties and Uses.—The Hydro-alcoholic Extract of Scullcap is tonic, nervine, and antispasmodic. It has been used with advantage in cases of nervous excitability, chorea, wakefulness, and restlessness; it may be used alone or in combination with the hydro-alcoholic extracts of cimicifuga, cypripedium, or asclepias. The dose is from one to five grains, three or four times a day.—*W. S. M.*

EXTRACTUM STILLINGIÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Queen's Root.*

Preparation.—Take of the recent Root of Stillingia, cut into small pieces, *two pounds*; Alcohol *a sufficient quantity*. Moisten the Stillingia with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add Alcohol until it passes

off without the taste of the Root. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence. To the root in the percolator, add gradually a *sufficient quantity* of Water, until the liquid passes but slightly impregnated with the properties of the Stillingia. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly till cold.

Properties and Uses.—In large doses the Hydro-alcoholic Extract of Stillingia is emetic and cathartic, for which actions it is but little employed in medicine, on account of the nausea, prostration, and burning sensation at the stomach caused by it. In small doses it is a valuable alterative, peculiar to Eclectic practice, and may be efficaciously used in all diseases requiring alterative remedies. It is usually given in combination with other alteratives, the virtues of which it appears to increase. The Compound Syrup of Stillingia is now more generally used in practice, but this extract will be found useful in cases where pills are preferred to fluid preparations. The dose is one, two, or three grains, three times a day.—*W. S. M.*

EXTRACTUM STRAMONII ALCOHOLICUM. *Alcoholic Extract of Stramonium.*

Preparation.—Take of recently dried Leaves of Stramonium a pound; Diluted Alcohol four pints. Moisten the leaves with half a pint of the Diluted Alcohol, and, having allowed it to stand for twenty-four hours, transfer it to a percolator, and add gradually the remainder of the Diluted Alcohol. When the last portion shall have penetrated the Stramonium, pour in sufficient water from time to time to keep the powder covered. Cease to filter when the liquid which passes begins to produce a precipitate, as it falls, in that which has already passed. Distil off the Alcohol from the filtered liquor, and evaporate the residue to the proper consistence. The heat in the evaporation should not be greater than that produced by a vapor-bath, otherwise decomposition will be apt to ensue. (*See Alcoholic Extract of Aconite.*)

An Alcoholic Extract may be also made by substituting the Stramonium Seed, ground into powder, for the Leaves. The seeds are supposed to furnish a more energetic preparation.

Properties and Uses.—The Alcoholic Extract of Stramonium is preferable either to an aqueous extract of the leaves, or their inspissated juice. It is, in large doses, a narcotic poison; in medicinal doses it is anodyne and antispasmodic, and may be administered with benefit in painful and periodic diseases, nervous excitability or irritability, gastritis, enteritis, peritonitis, dysmenorrhea, rigidity of the os uteri, etc., etc. It may also be applied externally in rheumatic and neuralgic pains, and to reduce local inflammations. The dose is from an eighth of a grain to a grain, three times a day.

EXTRACTUM TARAXACI. *Extract of Dandelion.*

Preparation.—Take of the recent Root of Dandelion, gathered in September, *five pounds*. Cut the root into small slices, and place it in a stone mortar; sprinkle on it a little water, and bruise it, until it is reduced to a pulp; then express the juice, strain, and evaporate in a vacuum, or in a shallow dish over a water-bath, constantly stirring, until it is of the proper consistence.

History.—In the evaporation of this extract, too much heat or too long an exposure to the action of the air, causes the extract to lose part of its bitterness and become sweetish, which is a sign of inferiority. To be good, the extract must be bitter and entirely free from any sweetness. The roots furnish a thin, watery, feeble-flavored juice when collected in the spring; while those gathered in autumn yield a thick, cream-colored, and bitter juice, amounting frequently to one-half the weight of the root. Age deteriorates this extract, hence, it should be freshly made annually.

Properties and Uses.—Extract of Dandelion is tonic, diuretic, and aperient. It is much recommended in affections of the liver, spleen, and kidneys, in dropsical diseases, etc. I have made much use of various preparations of dandelion, and the effects are far from being so decided and beneficial as the testimony of writers led me to suppose; we have several agents vastly superior to it in medicinal efficacy, in the diseases for which it is prescribed. The dose of it is from ten to sixty grains three times a day.

EXTRACTUM VIBURNI HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of High Cranberry Bark. Hydro-alcoholic Extract of Cramp Bark.*

Preparation.—Take of coarsely powdered Bark of Viburnum Opulus *two pounds*; Alcohol *a sufficient quantity*. Moisten the Bark with two pints of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without the taste of the High Cranberry Bark. Distil off the greater part of the Alcohol from this filtered tincture, and evaporate the residue to the proper consistence.

To the powder in the displacement apparatus, add gradually *a sufficient quantity* of Water, until the liquid passes but slightly impregnated with the properties of the High Cranberry Bark. Heat the filtered liquid to the boiling point, strain, and evaporate to the proper consistence.

Mix the alcoholic and aqueous extracts while each are hot, and stir constantly till cold.

Properties and Uses.—Hydro-alcoholic Extract of High Cranberry bark is tonic and antispasmodic, and may be used in all cases in which the High Cranberry bark is indicated. In uterine difficulties it may be advantageously combined with some uterine tonic, as cimicifugin, aletridin, senecin, caulophyllin, etc. In bilious and flatulent colic, and spas-

modic pains of the stomach and bowels, it will be found very efficacious in combination with dioscorein. The dose of it is from one to ten grains, three times a day.—*J. K.*

EXTRACTA FLUIDA.

Fluid Extracts.

These are concentrated medicinal principles, not reduced to a solid or nearly semifluid consistence as with extracts, and have the advantage over ordinary extracts in being prepared with less evaporation, and consequently less heat, whereby their activity is not so liable to impairment. With some medicines, as for instance, *Cubeba*, in which the medicinal virtue depends entirely upon a fluid substance, and cannot be reduced to a solid extract, the Fluid Extract presents a valuable mode of administration. The menstruum employed in the preparation of fluid extracts varies according to the character of the constituents comprising the virtues of the plant; thus, many agents require only Water, and those containing oil and resin require Alcohol or Ether, according to the degree of solubility in these menstrua, and their action upon non-medicinal principles which may exist in the substance under operation. One great difficulty relative to fluid extracts is their liability to spontaneous decomposition; this may be counteracted to a great extent by the addition of loaf-sugar, in the proportion of one ounce to every fluidounce of the extract; or other preservative agents may be employed in some cases, as alcohol, etc. When prepared by means of ether, these extracts generally keep well and for a long time, without any material unfavorable change.

Fluid Extracts.

BY W. S. MERRELL.

In our article on the "Progress of Pharmacy," it was observed that the Fluid Extract was a new and very eligible form, in the present state of the science, of exhibiting many valuable remedies. The medical powers of vegetables, as has been stated, depend on certain proximate principles, as acids, essential oils, resinoids, alkaloids, etc., and to obtain these in their separate and pure state, constitutes the climax of pharmaceutical progress; but there are many valuable plants of which the requisite analysis has not been made; others, in which the principle in which the chief medical activity resides is combined with some native acid, or with other principles of an extractive or mucilaginous character, which modifies their pathogenetic action; and in other cases again, we wish to obtain, in combination, the medical properties of several articles, of which the proximate principles are diverse, and to obtain them pure would require separate and dissimilar processes. Now, as nearly all medical principles are soluble in alcohol, either pure or dilute, all these

properties of an article or a compound, may be extracted by this menstruum, and presented together in their native state and proportions; and although such extracts are not as concentrated nor as definite in their strength as the pure proximate principles, yet, if skillfully prepared, they are sufficiently so for use in most cases.

The strength and quantity of Alcohol may properly be varied, as the ingredients are more or less resinous in their character. But the following formula will be found sufficiently definite in most cases:

R Ingredients to be extracted,..... one pound.
 Alcohol, 76 per cent.,..... four pints.
 White Sugar,..... four ounces.
 Water, a sufficient quantity.

Add to the ingredients, in a convenient close vessel, enough Alcohol to thoroughly wet them, and digest with as much warmth as can be used without distilling off the Spirit for twenty-four hours. Then transfer the whole to a percolator or displacement apparatus, and gradually add the rest of the Alcohol, returning a little of the first that comes through, till it runs clear. Reserve, by itself, of the first or strongest running, four fluidounces; evaporate the remaining Alcoholic Tincture that comes through to four fluidounces, and likewise set it aside. Then pour hot water on the residuum in the percolator, until the liquid that comes through has very little of the color or taste of the medicine; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm mix in the reserved Tincture and Extract, and make one pint of Fluid Extract. If necessary, from ten to twenty drops of any desired essential oil, as cloves, mint, or caraway, may be added to cover the taste and prevent nausea or griping.

This process is believed to be the best that can be pursued with the apparatus usually accessible to physicians and apothecaries. But the method pursued by me in preparing these Extracts, Syrups, etc., in larger quantities, secures the object in every respect more perfectly. This consists in placing the ingredients, previously ground, and in some cases macerated, into an appropriate vessel, in form like a common displacement apparatus or percolator, and driving the Alcohol, Water, or other menstruum, in the state of Vapor, downward through them.

Steam or the Vapor of Alcohol, penetrates every fiber of vegetable substances much more readily and perfectly than liquids, and brings all their proximate principles, especially the Resinoids, into a soluble state; but *dry* steam has no solvent power, it may soften, and expand, and fuse, but it cannot dissolve and carry out those principles, without a liquid as a vehicle. Therefore, to render the process perfect, we must obtain the combined action of Vapor and Liquid. Of Vapor to penetrate and soften, and of Liquid to dissolve and carry out.

The steam displacement apparatus, patented by Mr. C. Augustus Smith, is designed to attain this object, but unless the process is conducted slowly and with much skill, it is done very imperfectly. For if the vapor be condensed at the top of the apparatus, which will be the case if the surrounding condenser be kept full of cold water as directed, the menstruum will only percolate through in the state of liquid, and will effect no more than if poured on in the state of warm liquid. On the other hand, if the steam be not condensed above, but passes on through the ingredients dry, it affords no vehicle to carry with it the soluble substances. My mode perfects the process by obtaining the continually combined action of the solvent in Vapor and in Fluid. A full description of the apparatus and all the steps of the process in using it, cannot be given here without too greatly extending this article, nor could they be readily understood without the aid of appropriate drawings, and must, therefore, be omitted.

The lower end of the displacement vessel is connected with a worm, so that the liquid is fully condensed and cooled before it comes to the air. If the process be properly conducted the first portions displaced by the vapor will be very strong, and contain most of the Aroma and Essential Oils belonging to the ingredients.

Therefore, to prepare a Fluid Extract by this process, of the standard strength of one Fluidounce from one Avoirdupois ounce of the substance, we displace with the Vapor of Alcohol, combined with sufficient Alcohol to serve as a vehicle. Of the first and strongest solution or tincture thus obtained, set aside a portion equal in weight to half the ingredients that are acted on. This contains a large portion of the strength, and nearly all the essential oil and aroma, and is not to be submitted to heat at all. Continue the process until the strength is exhausted, and the liquid comes through but little impregnated with the flavor of the substance. Then turn on the steam of water, until the alcohol remaining in the substance can be driven out and condensed. From this second portion of solution distil off, at a low heat, in vacuo.

If the root or other substance is believed to contain any medicinal virtues not soluble in alcohol, then continue the operation with steam of water till these are extracted, and evaporate this watery solution to a semifluid extract. Mix this and the residuum from which the alcohol has been distilled, and add refined sugar equal to one-fourth of the ingredients used, and with a moderate heat evaporate the syrup to half the number of pints that there were pounds avoirdupois of the substance operated upon. To this, while simply warm, add the first solution that was obtained and set aside, and mix the two thoroughly. Then, if it be necessary, add a few drops of any Essential Oil, as before stated, to cover the taste, etc. Thus making from every pound of ingredients one pint of the fluid extract.

It may be asked, why so particular to use very moderate heat,

or distil in vacuo, to reduce the liquid to the proper quantity, after having acted on it by steam during the process of obtaining it. The reply is: 1st, that the temperature of the Vapor of Alcohol is not so high, by many degrees, as that of Boiling Water; and 2d, it is not the heat itself that destroys these delicate substances, but it is by the combined action of heat and water, and in most cases, of air also, that the more easily destructible proximate principles are oxidized and rendered inert. It is not, therefore, heat alone, but long boiling in water that dissipates all the volatile principles, as the essential oils, and decomposes others, and thus renders extracts prepared in the ordinary way comparatively worthless.

All Fluid Extracts are not made according to the above standard of concentration. In the Fluid Extract of Lobelia, all the Alcohol is evaporated off, and only the oil and extractive left; this is, therefore, condensed only two or three ounces from the pound, according to the quality of the seed.

In the Fluid Extract of Stillingia, on the other hand, the concentration is less than half that of the above-named standard, as the medicine is so powerful that a greater degree of concentration is not thought expedient.

(In the preparation I now make under the name of 'Concentrated Fluid Extracts,' I use Alcohol only, having become satisfied that all the medical virtues of every plant are extracted by that menstruum, if properly managed. And by thus rejecting the starch, gum, and extractive that are dissolved by the water, we are able to make a preparation four times the above strength and still retain its fluidity. In most of our fluid extracts, therefore, each ounce contains the virtues of a quarter of a pound of the ingredients—and some contain much more.—*W. S. M.*)

Medical Syrups are prepared after the same method as the fluid extracts, with the exception that they are less concentrated, and less alcohol and more sugar is employed in their composition. For, as they are taken in proportionably larger doses, the presence of spirit in them would be more appreciable and injurious."

EXTRACTUM ANTHEMIDIS FLUIDUM. *Fluid Extract of Chamomile.*

Preparation.—Take of bruised Chamomile Flowers *twelve ounces*; Alcohol, Water, of each, *a sufficient quantity*. Mix the Chamomile with a sufficient quantity of Alcohol, and allow it to stand for twenty-four hours; then transfer it to a percolator and pour Alcohol gradually upon it until a pint and a half of filtered liquid is obtained. Place this in an evaporating dish, and allow it to evaporate spontaneously until reduced to six fluidounces.

To the Flowers in the percolator, add gradually a sufficient quantity of Water until it passes without any of the taste of the Chamomile. Evaporate this portion in a water-bath to six fluidounces.

Mix together the alcoholic and aqueous solutions.

Properties and Uses.—This Fluid Extract of Chamomile Flowers is tonic, and possesses all the properties of the crude article. Each fluidounce of the Extract represents a fluidounce of the Flowers; hence the dose is from half a fluidrachm to a fluidrachm three times a day. It may be advantageously combined with the fluid extracts of cimicifuga, valerian, cypripedium, scutellaria, etc.

EXTRACTUM BUCHU FLUIDUM. *Fluid Extract of Buchu.*

Preparation.—Take of the coarsely powdered Leaves of Buchu *eight ounces*; Ether *four fluidounces*; Alcohol *twelve fluidounces*; Diluted Alcohol, or good Holland Gin, *a sufficient quantity*. Mix the Ether and Alcohol, and having incorporated the Buchu with one-half of the mixture, introduce it into a percolator, and gradually pour in the remainder. Then add Diluted Alcohol or good Holland Gin, until the whole liquid which has passed shall amount to a pint. Put the Ethereal Liquid thus obtained into a shallow vessel, and allow it to evaporate spontaneously until reduced to five fluidounces. Upon the mass in the percolator pour gradually Diluted Alcohol or good Holland Gin until ten fluidounces of Tincture have passed. With this mix the five fluidounces left after the spontaneous evaporation, taking care to dissolve in a little Alcohol any oleo-resinous matter which may have been deposited, and to add it to the rest. Allow the mixture to stand, with occasional agitation, for four hours, and then filter. The resulting Fluid Extract should measure a pint; and if it be less than that quantity, the deficiency should be supplied by the addition of good Holland Gin.

Properties and Uses.—Fluid Extract of Buchu is a gently stimulating diuretic, and may be used in chronic catarrh of the bladder, gravel, morbid irritation of the bladder and urethra, and other affections of the urinary organs. The dose is one or two fluidrachms, three times a day.

EXTRACTUM CIMICIFUGÆ FLUIDUM. *Fluid Extract of Black Cohosh.*

Preparation.—Take of recently dried Black Cohosh Root, in moderately fine powder, *sixteen Troy ounces*; Alcohol *one pint*; Ether *half a pint*; Diluted Alcohol *a sufficient quantity*. Mix the Cohosh with an equal weight of Sand, moisten it with a portion of the Alcohol, transfer it to a displacement apparatus for volatile liquids, and pour on the remainder of the Alcohol and the Ether. When the liquid commences to pass, close the orifice so that its passage shall be by drops; and when the menstruum disappears above, immediately add Diluted Alcohol until the filtered tincture measures a pint and a half. Set this aside in a capsule in a warm place until it is reduced to half a pint, and has lost its ethereal odor.

Meanwhile, continue the percolation with Diluted Alcohol until two pints more tincture are obtained. Evaporate this in a water-bath to eight fluidounces, and mix it gradually with the first product so as to

avoid as much as possible the precipitation of the resin from the latter. After standing a few hours the Fluid Extract should be filtered, and if it does not measure a pint add a sufficient quantity of Alcohol to make that measure.

If the amount of resin precipitated is considerable, it may be separated by a cloth-strainer, redissolved in a little Alcohol, and added to the solution, which should then be filtered.

History.—This Fluid Extract is prepared after the manner of W. Procter, Jr. It has a dark-reddish brown color like laudanum, is transparent, and possesses the bitter, disagreeable taste of the root in a marked degree. Its flavor may be improved by the addition of one pound Avoirdupois of white sugar, and a small portion of some aromatic essence.

Properties and Uses.—The Fluid Extract of Black Cohosh possesses tonic, narcotic, antispasmodic, alterative, and emmenagogue properties. It may be used with advantage in rheumatism, neuralgia, scrofula, syphilis, amenorrhea, dysmenorrhea, chorea, and all diseases in which the Root is indicated. The dose is from half a fluidrachm to two fluidrachms.

EXTRACTUM CINCHONÆ FLUIDUM. *Fluid Extract of Cinchona.*

Preparation.—Take of Calisaya Bark, in a uniform coarse powder, *eight troy ounces*, moisten it with Diluted Alcohol, and after standing twelve hours, pack the moist Bark properly in a percolator, and pour Diluted Alcohol on it gradually until *four pints* of tincture have passed, or until its bitterness is exhausted. Evaporate the tincture in a water-bath (or a still), to *nine fluidounces*; then add of Sugar *fourteen troy ounces*, continue the heat until it is dissolved, and strain while hot.

Properties and Uses.—Same as Peruvian bark, and may be used alone or in combination with other agents. Dose, one fluidrachm.—*A. B. Taylor.*

EXTRACTUM CORNUS FLORIDÆ FLUIDUM. *Fluid Extract of Dogwood.*

Preparation.—Take of Dogwood Bark, in coarse powder, *one pound*; Alcohol 76 per cent., *four pints*; White Sugar *six ounces*; Water *a sufficient quantity*. Moisten the Bark thoroughly with Alcohol and let it stand for twenty-four hours; then transfer it to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remaining alcoholic tincture that comes through to four fluidounces, and likewise set it aside. To the Powder in the percolator add gradually cold Water *a sufficient quantity*, until the liquid that passes is but slightly impregnated with the properties of the Dogwood; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluid-

ounces, and while warm, mix in the reserved tincture and extract, and make one pint of Fluid Extract.

Properties and Uses.—Fluid Extract of Dogwood is tonic, stimulant, and slightly astringent. It may be used in all cases where tonics are indicated, and will be found beneficial in female debility, leucorrhœa, etc. The dose is from half a fluidrachm to two fluidrachms.

EXTRACTUM CUBEÆ FLUIDUM. *Fluid Extract of Cubebs.*

Preparation.—“Take of Cubebs, in powder, *a pound*; Ether *a sufficient quantity*. Put the Cubebs into a percolator, and, having packed it carefully, pour Ether gradually upon it until two pints of filtered liquor are obtained; then distil off by means of a water-bath, at a gentle heat, a pint and a half of the Ether, and expose the residue in a shallow vessel, until the whole of the Ether has evaporated.”—*U. S.*

History.—This preparation consists principally of the volatile oil and resin of the Cubebs, with some cubebin and waxy matter. Its consistence varies according to the amount of volatile oil existing in the Cubebs, and its color is brownish, with more or less of a greenish tint, according to the quantity of chlorophylle present. On long standing, waxy matter and crystals of cubebin are deposited.

Properties and Uses.—This preparation possesses the virtues of Cubebs, and may be given in the dose of from five to thirty minims, suspended in water or emulsion, and repeated three times a day.

EXTRACTUM CYPRIPEDI FLUIDUM. *Fluid Extract of Yellow Ladies' Slipper Root.*

Preparation.—Take of Yellow Ladies' Slipper Root, in coarse powder, *one pound*; Alcohol 76 per cent., *four pints*; White Sugar *six ounces*; Water *a sufficient quantity*. Moisten the Root thoroughly with some of the Alcohol, and let it stand for twenty-four hours; then transfer it to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, until it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remaining Alcoholic tincture that comes through to four fluidounces; and likewise set it aside. To the Powder in the percolator add gradually *a sufficient quantity* of cold Water, until the liquid that passes is but slightly impregnated with the properties of the Cypripedium; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm, mix in the reserved tincture and extract, and make one pint of fluid extract.

Properties and Uses.—The Fluid Extract of Cypripedium is tonic, nervine, and antispasmodic, and may be beneficially employed in chorea, hysteria, nervous headache, and all cases of nervous irritability and excitability. A few drops of oil of anise may be added to it to improve its flavor. The dose is from half a fluidrachm to a fluidrachm three times a day.—*J. K.*

EXTRACTUM EPIGÆÆ FLUIDUM. *Fluid Extract of Trailing Arbutus.*

Preparation.—Take of the recently dried Leaves of *Epigæa Repens*, in coarse powder, *one pound*; Alcohol, 76 per cent., *four pints*; White Sugar *six ounces*; Water *a sufficient quantity*. Moisten the Leaves thoroughly with some of the Alcohol, and let it stand for twenty-four hours; then transfer it to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, until it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remaining Alcoholic tincture that comes through to four fluidounces, and likewise set it aside. To the Powder in the percolator add gradually *a sufficient quantity* of cold Water, until the liquid that passes is but slightly impregnated with the taste of the Leaves; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm, mix in the reserved Tincture and Extract, and make one pint of Fluid Extract.

Properties and Uses.—The Fluid Extract of Trailing Arbutus possesses diuretic and astringent properties, and will be found superior to the preparations of *uva ursi*, *buchu*, etc., in gravel, and various other disorders of the urinary organs. It may likewise be used in chronic diarrhea and summer complaint; the dose is one fluidrachm, three or four times a day.—*J. K.*

EXTRACTUM ERGOTÆ FLUIDUM. *Fluid Extract of Ergot.*

Preparation.—Take of fresh Ergot in powder, *eight ounces*; Ether *four fluidounces*; Alcohol *twelve fluidounces*, Water *a sufficient quantity*. Moisten the Ergot with some of the Ether, let it stand for twenty-four hours, and then transfer to a percolator, and add gradually the remainder of the Ether. When all has passed through, allow the Ethereal tincture to evaporate spontaneously. To the Powder in the percolator add gradually the Alcohol, and when all has passed, evaporate the filtered tincture to four fluidounces. Again add gradually to the Powder in the percolator, a sufficient quantity of Water, until the liquid passes without the taste of the Ergot; evaporate this liquid to four fluidounces and add to it *six ounces* of White Sugar, and again evaporate to four fluidounces.

Mix the alcoholic and aqueous solutions while hot, and when cold add the residuum of the evaporated Ethereal Tincture, and thoroughly incorporate by agitation.

History.—The ether in this preparation takes up a portion of the active principle in combination with the inert fixed oil; while the other agents, undoubtedly, take up certain proportions of the active principle not touched by the ether. The spontaneous evaporation of the ether gives the oil and active principle combined, and which must be well mixed with the other solutions. The heat, in evaporating the alcoholic and aqueous solutions, should be below 212°. As there is yet some doubt in relation

to the active principle of Ergot, a preparation which will represent the drug in its natural form, is desirable, and which is had in this fluid extract.

Properties and Uses.—This Fluid Extract may be used as a substitute for ergot in all cases, it is pleasant to the taste, is always ready for use, requires a small dose, and acts promptly without nausea. The dose is from half a fluidrachm to a fluidrachm; the latter dose is about equal to two doses of powdered ergot.

EXTRACTUM GENTIANÆ FLUIDUM. *Fluid Extract of Gentian.*

Preparation.—Take of Gentian, in coarse powder, *sixteen Troy ounces*; French Brandy *six fluidounces*; Water *a sufficient quantity*. Macerate the Gentian in two and a half pints of Water for twelve hours, and having introduced it into a percolator, allow the infusion to pass slowly, adding gradually Water until five pints of liquid have passed. Evaporate this to ten fluidounces by means of a water bath, add the Brandy, and strain through cotton flannel.

History.—This extract has a thin syrupy consistence, a dark brown color, free from sediment, and transparent in thin strata. With water it forms a clear mixture.

Properties and Uses.—Tonic, and may be given in doses of from half a fluidrachm to a drachm, which represent half a drachm to a drachm of Gentian Root. It may be variously combined with other agents to meet particular indications. For instance, should an aperient tonic with antacid properties be desired, the following form may be used: Take of Fluid Extract of Gentian, *two fluidounces*; Fluid Extract of Rhubarb, *two fluidrachms*; Bicarbonate of Potassa *one drachm*; Tincture of Ginger *two fluidrachms*. Mix. One fluidrachm of this mixture will be equal to about forty grains of gentian, six of rhubarb, and three of bicarbonate of potassa.

If a chalybeate tonic is desired, the following may be employed: Take of Citrate of Iron and Quinia *one drachm*; Water *six fluidrachms*; dissolve and add Fluid Extract of Gentian *two fluidounces*. A fluid drachm of this mixture will represent about forty-five grains of gentian, and three grains of citrate of iron and quinia. —Wm. Procter, Jr.

EXTRACTUM GENTIANÆ FLUIDUM COMPOSITUM. *Compound Fluid Extract of Gentian.*

Preparation.—Take of Gentian, in coarse powder, *sixteen Troy ounces*; Bitter Orange Peel, Coriander Seeds, of each, in coarse powder, *four ounces*; Water, Alcohol, of each, *a sufficient quantity*. Macerate the Gentian in two and a half pints of water for twelve hours, and introduce it into a percolator; allow the infusion to pass slowly, adding Water at intervals until five pints of liquid have passed. Evaporate this to ten fluidounces.

Macerate the Orange Peel and Coriander Seeds in a mixture of *eight fluidounces* of Alcohol, and *four fluidounces* of Water for twelve hours

introduce them into a percolator, and add gradually a *sufficient quantity* of Diluted Alcohol to displace twelve fluidounces of tincture. Evaporate this to six fluidounces by a gentle heat, (120° F.) add it to the solution of Gentian while hot, and strain. When finished, the Fluid Extract should measure a pint.—*Wm. Procter, Jr.*

History.—The Compound Fluid Extract of Gentian is a colored, thin, syrupy liquid. In the preparation of it I should prefer Prickly Ash Berries to the Coriander, both on account of their flavor, and well known influence on mucous tissues.

Properties and Uses.—Tonic and carminative, and may be given in doses of from half a fluidrachm to a fluidrachm.

EXTRACTUM HYOSCYAMI FLUIDUM. *Fluid Extract of Henbane.*

Preparation.—Take of the recently dried Leaves of Henbane, in coarse powder, *eight Troy ounces*; Diluted Alcohol a *sufficient quantity*; Sugar *eight Troy ounces*. Macerate the Henbane in a pint of Diluted Alcohol for twenty-four hours, transfer it to a percolator, and add gradually Diluted Alcohol, until three pints of tincture have passed. Evaporate the tincture to ten fluidounces, and dissolve the Sugar in it while hot; when cold add Alcohol, sp. gr. 0.835, *two fluidounces*, or sufficient to make a pint of Fluid Extract, and strain through fine muslin.

History.—This forms an elegant and durable preparation of Hyoscyamus. In percolation the fluid should be allowed to pass very slowly, that thorough exhaustion of the leaves may take place.

Properties and Uses.—This extract possesses all the virtues of Hyoscyamus, and may be given wherever the influence of the plant is desired. The dose is from ten to sixty minims.—*C. A. Smith.*

EXTRACTUM IRIDIS FLUIDUM. *Fluid Extract of Blue Flag.*

Preparation.—Take of recently dried Blue Flag Root, in coarse powder, *eight ounces*; Ether *four fluidounces*; Alcohol *twelve fluidounces*; Diluted Alcohol a *sufficient quantity*. Mix the Ether and Alcohol, and having incorporated the Blue Flag with one-half of the mixture, introduce the mass into a percolator, and gradually pour in the remainder. Then add Diluted Alcohol until the whole liquid which has passed shall amount to a pint. Put the Ethereal liquid thus obtained into a shallow vessel, and allow it to evaporate spontaneously until reduced to five fluidounces.

Upon the mass in the percolator pour gradually Diluted Alcohol until ten fluidounces of tincture have passed, and evaporate to five fluidounces. With this mix the five fluidounces left after spontaneous evaporation, taking care to dissolve in a little Alcohol any oleo-resinous matter which may have been deposited, and to add it to the rest. Allow the mixture to stand, with occasional agitation, for four hours, and filter.

The resulting Fluid Extract should be ten fluidounces; and if it be less

than that quantity, the deficiency should be supplied by the addition of Alcohol.

Properties and Uses.—This holds the virtues of Blue Flag in a concentrated state, and may be used in syphilis, dropsy, scrofula, and all diseases in which the crude article is indicated. The dose is from ten to thirty minims.—*J. K.*

EXTRACTUM LEPTANDRÆ FLUIDUM. *Fluid Extract of Black Root.*

Preparation.—Take of the recently dried Root of Leptandra Virginica, in coarse powder, *one pound*; Alcohol, 80 per cent., *four pints*; White Sugar *four ounces*; Water *a sufficient quantity*. Add to the Root, in a convenient close vessel, enough Alcohol to thoroughly moisten them, and let the mixture stand for twenty-four hours; then transfer it to a percolator, and add gradually the rest of the Alcohol, returning a little of the first that comes through, till it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remaining Alcoholic Tincture that comes through to four fluidounces, and likewise set it aside. Then pour Hot Water on the residuum in the percolator, until the liquid that passes has very little of the color or taste of the Blackroot; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm mix in the reserved Tincture and Extract, and make one pint of Fluid Extract.

Properties and Uses.—This Extract is laxative, cholagogue, and tonic, and may be advantageously substituted for the Root in all cases. The dose is from ten to sixty minims, one, two, or three times a day. As a laxative it is preferable to Leptandrin.—*J. K.*

EXTRACTUM LOBELIÆ FLUIDUM. *Fluid Extract of Lobelia.*

Preparation.—Mr. Procter employs the following process in preparing a Fluid Extract of Lobelia Herb: Macerate for twenty-four hours, Lobelia, finely bruised, in Diluted Alcohol *one pint and a half*, and Acetic Acid *one fluidounce*; introduce the mixture into an earthen displacer, and pour on slowly Diluted Alcohol *one pint and a half*, and afterward Water until three pints of tincture are obtained; evaporate this in a water-bath to ten fluidounces, strain, add Alcohol *six fluidounces*, and when mixed filter through paper. This process is based on the fact, that in the presence of an excess of acid, the lobelina of the natural salt, which gives activity to the drug, is not decomposed and destroyed by the heat used. A fluidrachm of this extract is equal to half a fluidounce of the tincture.

That which is commonly used by Eclectics is prepared according to the previous instructions by W. S. Merrell.

Properties and Uses.—The Fluid Extract of Lobelia possesses all the properties of the plant in a concentrated degree. It may be used wherever lobelia is indicated. The dose is from five minims to a

fluidrachm, according to the effect required ; and which are equivalent to five grains or a drachm of the powder.

EXTRACTUM LOBELIÆ FLUIDUM COMPOSITUM. *Compound Fluid Extract of Lobelia.*

Preparation.—Take of the recently dried Bloodroot, Skunkcabbage Root, and Lobelia Seeds and Leaves, of each, coarsely powdered, *five ounces and a half* ; Alcohol, 80 per cent., *four pints* ; White Sugar *four ounces* ; Water *a sufficient quantity*. Moisten the articles mixed together with sufficient Alcohol, and let them stand for twenty-four hours ; then transfer the mixture to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first or strongest running, four fluidounces ; evaporate the remaining Alcoholic tincture that comes through to four fluidounces, and likewise set it aside. Then pour Hot Water on the residuum in the percolator, until the liquid that comes through has very little of the color or taste of the medicine ; evaporate this latter solution to half a pint, by a heat considerably below the boiling point, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm mix in the reserved tincture and extract, and make one pint of Fluid Extract.

Properties and Uses.—This fluid extract is emetic, expectorant, and antispasmodic, and may be used as a substitute for the Acetated Tincture of Bloodroot. A fluidrachm of the extract is equivalent to about a drachm of the powder ; the dose is from ten to sixty minims according to the desired effect.—*W. S. M.*

EXTRACTUM POLYGONI FLUIDUM. *Fluid Extract of Water Pepper.*

Preparation.—Take of the recently dried Leaves of Water Pepper, in coarse powder, *one pound* ; Alcohol, 76 per cent., *four pints* ; White Sugar *four ounces* ; Water *a sufficient quantity*. Moisten the Leaves thoroughly with Alcohol, and let them stand for twenty-four hours ; then transfer them to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that comes through, till it passes clear. Reserve, by itself, of the first running, four fluidounces ; evaporate the remaining Alcoholic tincture that passes to four fluidounces, and likewise set it aside. Then gradually add *a sufficient quantity* of Water to the residuum in the percolator, until the liquid that comes through has very little of the color or taste of the Water Pepper ; evaporate this latter solution to half a pint, then add the Sugar ; continue the evaporation until the syrup is reduced to eight fluidounces, and while warm, mix in the reserved tincture and extract, and make one pint of Fluid Extract.

Properties and Uses.—Fluid Extract of Water Pepper possesses the properties of the herb in a concentrated form, and may be given whenever that is indicated. It is especially useful in uterine diseases. The dose is from ten to sixty minims, three or four times a day.

EXTRACTUM RHEI FLUIDUM. *Fluid Extract of Rhubarb.*

Preparation.—Take of Rhubarb, in coarse powder, *eight ounces*; Sugar *five ounces*; Tincture of Ginger *half a fluidounce*; Oil of Fennel, Oil of Anise, each *four minims*; Diluted Alcohol *a sufficient quantity*. To the Rhubarb, previously mixed with an equal bulk of coarse Sand, add twelve fluidounces of Diluted Alcohol, and allow the mixture to stand for twenty-four hours. Transfer the mass to a percolator, and gradually pour upon it Diluted Alcohol until the liquid which passes has little of the odor or taste of Rhubarb. Evaporate the tincture thus obtained, by means of a water-bath, to five fluidounces; then add the Sugar, and, after it is dissolved, mix thoroughly with the resulting Fluid Extract, the Tincture of Ginger holding the oils in solution.—*U. S.*

Properties and Uses.—This forms a good preparation of Rhubarb, the root being nearly exhausted by the menstruum, and the active principles not being injuriously affected, if the evaporation be carefully conducted, without too great a degree of heat. The dose is half a fluidrachm for an adult, which is equivalent to half a drachm of rhubarb. This is inapplicable to acute inflammatory affections, on account of the stimulus it contains, in the alcohol and oils.

EXTRACTUM RHEI ET POTASSÆ FLUIDUM. *Fluid Extract of Rhubarb and Potassa. Fluid Neutralizing Extract.*

Preparation.—Take of the Root of the best India Rhubarb, and Bicarbonate of Potassa, of each, *two pounds Avoirdupois*; Cassia or Cinnamon, and Golden Seal, of each *one pound*; good French Brandy, fourth proof, *one gallon*; Oil of Peppermint *one fluidrachm*; Refined Sugar *three pounds*; Water *a sufficient quantity*. Grind, or coarsely bruise the Rhubarb, Cassia, and Golden Seal, and mix them. Macerate them for twenty-four hours, or longer in the Brandy; then express the tincture with strong pressure, and add to it the Oil of Peppermint previously dissolved in a little Alcohol. Break up the cake, or compressed residue from the press, place it in a percolator, and gradually add warm Water, until the strength of the articles is exhausted. Evaporate this solution to four pints, and while the liquor is still hot, dissolve in it the Bicarbonate of Potassa and Refined Sugar. Continue the evaporation, if necessary, until, when added to the tincture first obtained, it will make one gallon and a half of Fluid Extract, and mix the two solutions together. In adding the Bicarbonate of Potassa the liquid must not be too hot else it will be converted into the sesquicarbonate.

Properties and Uses.—This is an elegant and superior preparation, being an improvement upon the Neutralizing Cordial. It is used for the same diseases as the Compound Powder of Rhubarb, and is a more eligible form of administration. Two fluidrachms of this Fluid Extract are equivalent to one drachm of the powder.—*W. S. M.*

EXTRACTUM RHUS FLUIDUM. *Fluid Extract of Sumach.*

Preparation.—Take of the recently dried Bark of Rhus Glabrum, in coarse powder, *one pound*; Alcohol, 76 per cent., *four pints*; White Sugar *four ounces*; Water *a sufficient quantity*. Add sufficient Alcohol to the Bark to thoroughly moisten it, and let it macerate for twenty-four hours; then transfer the mixture to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remainder of the Alcoholic tincture that passes, to four fluidounces, and likewise set it aside. Then pour Hot Water on the residuum in the percolator, until the liquid that comes through has very little of the taste of the Sumach; evaporate this latter solution to half a pint, then add the sugar; continue the evaporation until the syrup is reduced to eight fluidounces, and while warm mix in the reserved tincture and extract, and make one pint of Fluid Extract.

Properties and Uses.—The Fluid Extract of Sumach is tonic, astringent, and antiseptic. It will be found beneficial in scrofula, gonorrhea, diarrhea, dysentery, and in mercurial sore mouth and salivation. The dose is from half a fluidrachm to a fluidrachm, three times a day.

EXTRACTUM SARSAPARILLÆ FLUIDUM COMPOSITUM. *Compound Fluid Extract of Sarsaparilla.*

Preparation.—Take of Sarsaparilla Root, sliced and bruised, *sixteen ounces*; Liquorice root, bruised, Bark of Sassafras Root, bruised, of each, *two ounces*; Mezereon, sliced, *six drachms*; Diluted Alcohol *eight pints*; White Sugar *twelve ounces*. Macerate all the articles together, excepting the Sugar, for fourteen days; then express and filter. Evaporate the tincture, by means of a water bath, to twelve fluidounces, and add the Sugar to it while hot. Remove from the bath as soon as the Sugar is dissolved.

Properties and Uses.—This fluid extract is alterative, and may be used in scrofula and secondary syphilis. The dose is a fluidrachm, which is equivalent to a drachm of the root, three or four times a day. With the exception of the omission of Guaiacum Wood, this formula is the one proposed by W. Hodgson, Jr.

EXTRACTUM SCUTELLARIÆ FLUIDUM. *Fluid Extract of Scullcap.*

Preparation.—Take of the recently dried Leaves of Scullcap, in coarse powder, *one pound*; Alcohol, 76 per cent., *four pints*; White Sugar *four ounces*; Water *a sufficient quantity*. Add a sufficient quantity of the Alcohol to the Scullcap to thoroughly moisten it, and allow the mixture to macerate for twenty-four hours; then transfer it to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that comes through, till it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remaining Alcoholic tincture that passes to four fluidounces, and likewise set it aside. Then

pour gradually on the residuum in the percolator a sufficient quantity of Hot Water, until the liquid that passes is but slightly impregnated with the properties of the Scullcap; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm mix in the reserved tincture and extract, and make one pint of Fluid Extract.

Properties and Uses.—Fluid Extract of Scullcap is tonic, nervine, and antispasmodic, and is a very convenient and eligible form of administering the active principles of the plant. It may be used in all cases where the herb is indicated. The dose is from half a fluidrachm to a fluidrachm, three or four times a day.—*J. K.*

EXTRACTUM SENECII FLUIDUM. *Fluid Extract of Life-root.*

Preparation.—Take of the recently dried Herb Senecio Aureus, in coarse powder, *one pound*; Alcohol, 76 per cent., *four pints*; White Sugar *four ounces*; Water *a sufficient quantity*. Add a sufficient quantity of the Alcohol to the Herb to thoroughly moisten it, and allow the mixture to macerate for twenty four hours; then transfer it to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remaining Alcoholic tincture that passes to four fluidounces, and likewise set that aside. Then pour gradually on the residuum in the percolator a sufficient quantity of Hot Water, until the liquid that passes is but slightly impregnated with the properties of the Life-root Herb; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm mix in the reserved tincture and extract, and make one pint of Fluid Extract.

Properties and Uses.—This Fluid Extract possesses the medical virtues of the Life-root, and forms a useful agent in amenorrhea, either alone, or in combination with the fluid extracts of black cohosh, water-pepper, etc. It may, likewise, be used advantageously in the other diseases in which the root is found efficient. The dose is from half a fluidrachm to a fluidrachm, three or four times a day.—*J. K.*

EXTRACTUM SENNÆ FLUIDUM. *Fluid Extract of Senna.*

Preparation.—Take of Senna, in coarse powder, *two pounds and a half*; Sugar *twenty ounces*; Oil of Fennel *a fluidrachm*; Hoffman's Anodyne *two fluidrachms*; Diluted Alcohol *four pints*. Macerate the Senna with the Diluted Alcohol for twenty-four hours, then introduce the mixture into a percolator, and gradually add Water mixed with one-third of its bulk of Alcohol, until a gallon and a half of liquid shall have passed. Evaporate the liquid by means of a water-bath to twenty fluidounces; filter, add the Sugar while the Fluid is hot, and when it is all dissolved, add the Oil of Fennel dissolved in Hoffman's Anodyne.

Properties and Uses.—This forms a neat preparation of Senna; the addition of Hoffman's Anodyne is to prevent fermentation. The dose for an adult is half a fluidounce.—*Duhamel.*

EXTRACTUM SENNÆ ET JALAPÆ FLUIDUM. *Fluid Extract of Senna and Jalap. Fluid Extract of Antibilious Physic.*

Preparation.—Take of Senna, in coarse powder, *one pound*; Jalap Root, in coarse powder, *half a pound*; Alcohol, 76 per cent., *six pints*; Carbonate of Potassa *six drachms*; White Sugar *eight ounces*; Diluted Alcohol *a sufficient quantity*; Oil of Cloves *forty minims*; Hoffman's Anodyne *one fluidrachm and a half*. Mix the Senna and Jalap together, and add a sufficient quantity of Alcohol to thoroughly moisten them, and let the mixture stand for twenty-four hours; then transfer it to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first running, six fluidounces; evaporate the remaining Alcoholic tincture that comes through to six fluidounces, and likewise set it aside. Then add a sufficient quantity of Diluted Alcohol to the residuum in the percolator, until the liquid passes but very little impregnated with the properties of the medicines; evaporate this latter solution to twelve fluidounces, then add the Sugar, and continue the evaporation until the syrup is reduced to twelve fluidounces, and while warm add the Carbonate of Potassa, the Oil of Cloves previously dissolved in Hoffman's Anodyne, also the reserved tincture and extract, and make one pint and a half of Fluid Extract.

Properties and Uses.—This is a concentrated form of the Compound Powder of Jalap, and may be given with safety in all cases where a purgative is required. Should any resinous matter be deposited, it must be dissolved in Alcohol and combined with the extract; the addition of the Carbonate of Potassa is to enable the resinous matter deposited during evaporation, to be dissolved, also to aid in counteracting the griping property of the medicine. The dose for an adult is a fluidrachm, which is about equivalent to one drachm of the powder.—*W. S. M.*

EXTRACTUM SENNÆ ET RHEI FLUIDUM. *Fluid Extract of Senna and Rhubarb.*

Preparation.—Take of Senna, in coarse powder, *twelve ounces (Troy)*; Rhubarb, in coarse powder, *four ounces*; Bicarbonate of Potassa *half an ounce*; Sugar *eight ounces*; Tincture of Ginger *a fluidounce*; Oil of Cloves *eight minims*; Oil of Anise *sixteen minims*; Alcohol, and Water, of each, *a sufficient quantity*. Mix the Senna and Rhubarb together, pour upon them two pints of Diluted Alcohol, and allow them to macerate for twenty-four hours; then introduce the mixture into a percolator furnished below with a stop-cock or cork to regulate the flow. A mixture of one part of Alcohol and three of Water should now be gradually added, so as to keep a constant but slow displacement of the absorbed

menstruum, until one gallon of tincture has passed. Evaporate this in a water-bath to eleven fluidounces, dissolve in it the Sugar and Bicarbonate of Potassa, and after straining, add the Tincture of Ginger holding the Oils in solution, and mix. When finished the whole should measure a pint.

History.—If the percolation has been properly conducted, the ingredients will have been sufficiently exhausted when six pints of fluid have passed. As by far the larger portion of the soluble matter passes in the first two pints, it is well to set these aside and evaporate them separately to six fluidounces, subsequently adding it to the other liquid when it has been reduced to five fluidounces. As the cathartic principles of senna and rhubarb are very susceptible to injury from heat, especially in contact with the air, the propriety of using the best available means for conducting the evaporation need not be urged. When the evaporation is conducted in open vessels, some advantage is gained by adding the sugar to the tincture and continuing the process until it measures fifteen fluidounces. The sugar protects the extractive matter from oxidation, and more completely suspends or dissolves the resinous part of the rhubarb contained in the tincture. The bicarbonate of potassa should not be added to the extract while it is above 140° F., and should be reduced to powder previously.

Properties and Uses.—Senna has little, if any, tonic influence on the alimentary surfaces; an overdose has a depleting effect, often inconvenient, and its exhibition is frequently attended with griping. Rhubarb, on the other hand, possesses both a purgative and astringent property, the latter coming into play *after* the former has manifested itself, and thus repairing, as it were, its effects. This astringent or tonic action of rhubarb is so strongly marked, that, in most cases, when a simple cathartic is needed, it becomes necessary to combine this drug with some other cathartic to overcome or modify this peculiarity. By the union of senna and rhubarb in the concentrated form presented by a fluid extract, and in a due proportion, a resulting cathartic is obtained which is safe, unattended by unpleasant symptoms, and not followed by constipation when the dose has been properly graduated. The association of alkalies and alkaline salts with rhubarb and senna, has a tendency to prevent their griping, and in the case of senna, to increase its activity. The dose of this fluid extract, for an adult, is from half a fluidrachm to a fluid drachm.—*Wm. Procter, Jr.*

EXTRACTUM SERPENTARIE FLUIDUM. *Fluid Extract of Virginia Snakeroot.*

Preparation.—Take of Virginia Snakeroot, in coarse powder, *twelve ounces*; Alcohol and Water, of each, *a sufficient quantity*. Mix the Serpentaria with twelve ounces of Alcohol, and allow it to stand for twenty-four hours; then transfer it to a percolator and gradually add Alcohol

until a pint and a half of filtered liquor is obtained. Place this in an evaporating dish, and allow it to evaporate spontaneously until reduced to six fluidounces. To the root in the percolator, exhausted by alcohol, add gradually a sufficient quantity of Water, until it is exhausted, or until about three pints have passed; (to which, if required, Sugar *six ounces* may be added and dissolved). Evaporate this last aqueous solution in a water-bath, to six fluidounces, and while warm, add the six fluidounces obtained by spontaneous evaporation of the alcoholic tincture, mix together, and strain.

Properties and Uses.—This fluid extract forms a useful tonic, which may be used in cases where the root is admissible. Each ounce of it represents an ounce of the root. The dose is from fifteen to forty-five minims, three or four times a day.—*A. B. Taylor.*

EXTRACTUM SPIGELIÆ ET SENNÆ FLUIDUM. *Fluid Extract of Spigelia and Senna.*

Preparation.—Take of Pink Root, in coarse powder, *one pound*; Senna, in coarse powder, *six ounces*; Sugar *one pound and a half*; Carbonate of Potassa *six drachms*; Oil of Caraway, Oil of Anise, of each, *half a fluidrachm*; Diluted Alcohol *a sufficient quantity*. Macerate the Pink Root and Senna for two days, with Diluted Alcohol two pints; then transfer the mixture to a percolator, and gradually add Diluted Alcohol, until half a gallon of liquid has passed. Evaporate the tincture thus obtained, by means of a water-bath, to a pint; then add the Carbonate of Potassa, and after it has dissolved the resinous sediment, add the Sugar previously triturated with the Oils, effecting its solution by a gentle heat.—*U. S.*

Properties and Uses.—This fluid extract combines the cathartic properties of senna, with the anthelmintic virtues of pink root; it is not offensive to the taste, and is generally acceptable to the stomach. The dose is half a fluidounce for an adult; a fluidrachm for a child two years old.

EXTRACTUM STILLINGIÆ FLUIDUM. *Fluid Extract of Queen's Root. Bronchial Elixir.*

Preparation.—Take of the recently gathered Root of Stillingia, cut into small pieces, *one pound*; Alcohol, 76 per cent., *four pints*; White Sugar *eight ounces*; Oil of Caraway *a fluidrachm*; Water *a sufficient quantity*. Cover the Root with Alcohol, and let the mixture stand for twenty-four hours; then transfer it to a percolator, so packed as to admit of a slow running, and add gradually the remainder of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remainder of the Alcoholic tincture that comes through to four fluidounces, and likewise set it aside. Then pour Hot Water on the residuum in the percolator, until the liquid that comes through is but slightly impregnated with

the properties of the *Stillingia*; evaporate this solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm, mix in the reserved tincture and extract, and then the Oil of Caraway, and make one pint of Fluid Extract.

Properties and Uses.—This fluid extract possesses all the active properties of the Queen's Root, in a concentrated form, one fluidrachm being equal to one drachm of the root. On account of its great activity it is never used in scrofula, syphilis, etc., in which the more agreeable and sufficiently active and efficacious Compound Syrup of *Stillingia* is preferred. It has been, however, found very efficient in bronchitis, laryngitis, and various pulmonary affections. The dose is from two to five or ten drops, to be placed upon the tongue, and allowed to pass very slowly into the stomach.—*W. S. M.*

EXTRACTUM TARAXACI FLUIDUM. *Fluid Extract of Dandelion.*

Preparation.—Take of the recently-dried Root of Dandelion, in coarse powder, *four pounds*; Alcohol *twelve fluidounces*; Sugar *two pounds*; Water *a sufficient quantity*. Moisten the root with Cold Water, and let it stand for twenty-four hours; then express, filter, add the Alcohol, and set the liquid aside. Break up the cake produced by the pressure, cover it with Cold Water, and let it stand twenty-four hours; again express, filter, and add the Sugar to the liquid. Evaporate in shallow vessels by means of a water-bath, to a quantity that shall just make forty-eight fluidounces on the addition of the first reserved solution, and mix the two liquors.

History.—Dandelion is very much injured in its medicinal properties by heat, hence, the importance of employing as little heat in making the above fluid extract as possible. Mr. Wm. Procter, Jr., offers the following mode of obtaining the virtues of dandelion, by which the natural juice may be preserved unimpaired: Take of fresh Dandelion Roots (collected in September or October) *twenty pounds*, Avoirdupois; Alcohol, sp. gr. 0.835, *four pints*. Slice the roots transversely in short sections, and by means of a mill or mortar and pestle reduce them to a pulpy mass; then add the Alcohol and mix them thoroughly. The mixture thus far prepared at the season when the root is proper for collection, may be set aside in suitable vessels; stoneware jars are appropriate; and extracted as the preparation is needed through the other seasons. After having stood a week, or until a convenient time, the pulpy mass is subjected to powerful pressure, until as much as possible of the fluid is removed. This is then filtered and bottled for use. It is necessary that sufficient time should elapse after the pulp is set aside, for the alcohol to penetrate the fibrous particles and commingle with the natural juices, as well as for the woody structure of the root to lose its elasticity, that it may yield the juice more completely on pressure. When the pulp has stood six months in this manner it yields the

juice with great readiness, and is possessed of the sensible properties of the dandelion in a marked degree. When eight pounds, Avoirdupois, of the root is thus treated, after standing several months, the practical result is about six pints of fluid, with an ordinary screw-press. This yield will vary in amount with the condition of the root when collected, and the length of time it is exposed afterward, as well as the power of the press used. Should the alcohol in this preparation be contra-indicated, it might be partially removed by exposure in a water-bath until the juice was reduced to five-sixths of its bulk, and then for every pint of the residue, eight ounces, Troy, of Sugar may be added and dissolved in it.

Properties and Uses.—Fluid Extract of Dandelion may be administered in all cases when the influence of this drug upon the system is desired. The dose is one or two fluidrachms three times a day. Some practitioners speak very highly of the therapeutical influence of dandelion; others, myself among the number, do not; probably, in the latter instances, the cause may exist in using preparations rendered inert by the heat employed in their manufacture.

EXTRACTUM VALERIANÆ FLUIDUM. *Fluid Extract of Valerian.*

Preparation.—“Take of Valerian, in coarse powder, *eight ounces*; Ether *four fluidounces*; Alcohol *twelve fluidounces*; Diluted Alcohol *a sufficient quantity*. Mix the Ether and Alcohol, and having incorporated the Valerian with one half of the mixture, introduce the mass into a percolator, and gradually pour in the remainder. Then add Diluted Alcohol until the whole liquid which has passed shall amount to a pint. Put the ethereal liquid thus obtained into a shallow vessel, and allow it to evaporate spontaneously until reduced to five fluidounces. Upon the mass in the percolator pour gradually Diluted Alcohol until ten fluidounces of tincture have passed. With this mix the five fluidounces left after the spontaneous evaporation, taking care to dissolve in a little Alcohol any Oleo-resinous matter which may have been deposited, and to add it to the rest. Allow the mixture to stand, with occasional agitation, for four hours, and then filter. The resulting Fluid Extract should measure a pint; and if it be less than that quantity, the deficiency should be supplied by the addition of alcohol.”—*U. S.*

Properties and Uses.—This holds the virtues of Valerian in a concentrated state, and may be used when desired to obtain the influence of that agent. It may also be combined with various other fluid extracts, as of cimicifuga, cypripedium, senecio, etc. The dose is one or two fluidrachms, three times a day, or oftener if required.

EXTRACTUM XANTHOXYLI FLUIDUM. *Fluid extract of Prickly Ash.*

Preparation.—Take of Prickly Ash Bark, in coarse powder, *one pound*; Alcohol, 76 per cent., *four pints*; White Sugar *four ounces*; Diluted Alcohol *a sufficient quantity*. Moisten the bark thoroughly with

Alcohol, and let it stand twenty-four hours; then transfer the mixture to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first running four fluidounces; evaporate the remaining Alcoholic tincture that comes through to four fluidounces, and likewise set it aside. Then add a sufficient quantity of Diluted Alcohol to the residuum in the percolator, until the liquid that comes through has very little of the taste of the medicine; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm mix in the reserved tincture and extract, and make one pint of Fluid Extract.

Properties and Uses.—Fluid Extract of Prickly Ash Bark is a stimulant, tonic, alterative, and sialogogue, and may be used in all cases where the bark is indicated or desired. The dose is from ten to thirty minims, three times a day.—*J. K.*

FERRUM.

Preparations of Iron.

FERRI ACETAS. *Acetate of Iron.*

Preparation.—Take of Carbonate of Iron *one ounce*; Acetic Acid *six ounces*. Digest for three days, and filter.

History.—This solution has a deep red color, and an acid and strongly chalybeate taste. It is *incompatible* with alkalis and their carbonates, the strong acids, and vegetable astringent infusions.

Properties and Uses.—Tonic and astringent, and possesses the general medical properties of the preparations of iron. A diluted solution of it, with a few drops of creosote, will be found a valuable injection in leucorrhœa. Dose, five to twenty drops, in water. (*See Tinctura Ferri Acetatis.*)

FERRI CARBONAS SACCHARATUM. *Saccharine Carbonate of Iron.*

Preparation.—Take of Sulphate of Iron *four ounces*; Carbonate of Soda *four ounces and a quarter*; Sugar *two ounces*; Boiling Distilled Water *four pints*, Imperial measure. Dissolve separately the Sulphate of Iron, and Carbonate of Soda, each in two pints of the Water. Mix the solutions while still hot, and set the mixture aside, that the Carbonate of Iron may subside. Then, having poured off the supernatant liquor, wash frequently the precipitated Carbonate. To this add the Sugar, dissolved in *two fluidounces* of Water, and evaporate the mixture by means of a water-bath until the powder is dry. Keep this in a well stopped bottle.—*Lond.*

History.—When a solution of sulphate of iron is mixed with a solution of carbonate of potassa, a double decomposition ensues, resulting in a precipitate of carbonate of protoxide of iron, which falls of a pale-bluish color, and sulphate of soda, which remains in solution. The

precipitate formed by this action, absorbs oxygen very rapidly when exposed to the air, and soon changes into the sesquioxide of iron, which together with its preparations are not so much esteemed in medicine as the protoxide and its preparations. The sesquioxide formed from this precipitate usually retains some of the carbonate of the protoxide which has remained unchanged. As saccharine matter prevents the absorption of oxygen, and consequently preserves the carbonate of the protoxide of iron from passing into sesquioxide, sugar is added to effect this object.

Saccharine Carbonate of Iron is of a grayish-green color, with a sweet and strongly chalybeate taste, is permanent in the air, and readily dissolves in muriatic acid with effervescence.

Properties and Uses.—This forms an excellent chalybeate tonic, and is superior to the subcarbonate of iron, but inferior to Vallet's Ferruginous mass, which has the advantage of being prepared with the anti-oxidizing influence of sugar from the commencement. (*See Pilulæ Ferri Carbonatis.*) The stools are rendered greenish-black by its use. The dose is five to thirty grains, in the form of pill.

FERRI CITRAS. *Citrate of Iron.*

Preparation.—Take of Citric Acid *five ounces and a half*; Distilled Water *five fluidounces*; moist Hydrated Oxide of Iron (prepared according to the formula given hereafter), *a sufficient quantity*. Dissolve the Acid in the Water, in a platinum capsule; heat the Solution to about 150° , maintain it at this temperature, and gradually add the Hydrated Oxide, in its moist and recent state, as long as any is dissolved, and until the Acid is fully saturated. Filter the liquid, and evaporate it to the consistence of thick molasses. Then spread it out thinly on glass or porcelain plates, where it speedily dries in thin layers, which are to be detached from the plates, and broken into fragments.

History.—In this process, the temperature directed promotes the solution of the sesquioxide; while a higher temperature would lessen its solubility. Citrate of Iron, is of a beautiful garnet-red color, uncrystallizable, slowly soluble in cold water, but readily soluble in boiling water, with an acid, not unpleasant chalybeate taste. It consists of one equivalent of Citric Acid 165, and one of Sesquioxide of Iron $80=245$.

When the excess of acid in this salt is neutralized by adding Solution of Ammonia to its solution, the double salt, called Ammonio-citrate of Iron (*Ferri Ammonio-Citras*), is formed in solution. By evaporating this to the consistence of syrup, pouring it in thin layers on earthenware plates, and drying with a gentle heat, the salt is obtained in scales. The heat, however, drives off a great portion of the Ammonia. *Ammonio-citrate of Iron* is in scales of a garnet-red color, much more readily soluble in cold water than the Citrate of Iron, and possesses an acidulous, slightly chalybeate taste. Potassa and lime-water decompose it, with evolution of ammonia, and a precipitate of the sesquioxide of iron; ferrocyanuret of potassium does not render it blue.

Properties and Uses.—These salts are pleasant chalybeate tonics, and may be given in doses of from four to ten grains of either, in pill or solution, and repeated four or five times a day. The citrate is best given in the form of pill.

FERRI ET QUINIAE CITRAS. *Citrate of Iron and Quinia.*

Preparation.—Take of Citrate of Iron *five ounces*; recently precipitated Quinia *one ounce*; Citric Acid *two drachms*; Distilled water *twelve fluidounces*. Mix these together in a capsule, and apply heat, but not sufficient to produce ebullition; stir constantly. When the articles are all dissolved, evaporate the solution carefully to the consistence of syrup, and spread it in thin layers on glass, to dry.

History.—Citrate of Iron and Quinia is in the form of scales, which are shining, and of a more or less deep garnet-color. It may also be made in the following manner; Dissolve Citrate of Iron *four parts*, Citrate of Quinia, *one part*, in Distilled Water, and evaporate the solution to dryness, as directed for Citrate of Iron.

Properties and Uses.—A valuable tonic. Dose, five to ten grains, three times a day, either in solution or pill.

FERRI ET MORPHIAE TARTRAS. *Ferrotartrate of Morphia. Tartrate of Iron and Morphia.*

Preparation.—Take of crystallized Tartaric Acid, Distilled Water, each, by weight, *two ounces*; moist Hydrated Sesquioxide of Iron, pure Morphia, of each, *a sufficient quantity*. Boil the Tartaric Acid and the Distilled Water together, in a glass or platina vessel; as soon as the Acid is dissolved, add the Iron until the fluid will dissolve no more. Heat the mixture until the deep blood-red fluid becomes clear, and then add the Morphia until the fluid ceases to dissolve it. Evaporate the solution by means of gentle heat, to the consistence of thick syrup, and spread it in thin layers on glass, to dry.

History.—This salt was first prepared by Professor J. Milton Sanders, formerly Professor of Chemistry in the Eclectic Medical Institute of Cincinnati, and previously my colleague in the Memphis Institute. It is in pellicles of a deep crimson color, and belongs to that class of non-crystallizable or factitious salts, as the Ferro-citrate of Iron and Quinia, so popular with the Medical profession for the last eight or ten years; on account of its ready solubility and promptness of action it is much employed among Eclectics, with whom it constitutes a valuable agent. It is *incompatible* with astringent vegetable infusions, strong acids, alkalies, and their carbonates.

Properties and Uses.—This salt is an active and efficient tonic and sedative, and may be employed in all cases of debility, chlorosis, anemia, etc., connected with an irritable or excitable condition of the system. In the intermission or remission of fevers, it may be used with much advantage, assisting materially in lessening the severity of the subsequent

febrile exacerbations, or breaking them up entirely. Professor Z. Freeman, myself, and various other practitioners have administered it with much benefit. The dose for an adult is from half a grain to a grain, every two or three hours, or until its sedative influence is fully obtained.

FERRI ET QUINIAE TARTRAS. *Ferrotartrate of Quinia. Tartrate of Iron and Quinia.*

Preparation.—Take of Crystallized Tartaric Acid, Distilled Water, each, by weight, *two ounces*; moist Hydrated Sesquioxide of Iron, pure Quinia, of each, *a sufficient quantity*. Boil the Tartaric Acid and the Distilled Water together, in a glass or platina vessel; as soon as the Acid is dissolved, add the Iron as long as the fluid will dissolve it. Heat the mixture until the deep blood-red fluid becomes clear, and then add the Quinia until the fluid ceases to dissolve it. Evaporate the solution by means of gentle heat, to the consistence of thick syrup, and spread it in thin layers on glass, to dry.

History.—This salt was, likewise, first prepared by Professor J. Milton Sanders, and is superior to the Citrate of Iron and Quinia, on account of its greater solubility, and its activity as a remedial agent. It forms into scales of a beautiful crimson color. It is *incompatible* with astringent vegetable infusions, strong acids, alkalies, and their carbonates.

Properties and Uses.—The Ferrotartrate of Quinia is a valuable tonic, and may be used with benefit in chlorosis, amenorrhea, debility, anemia, and during the remissions or intermissions from fever; also in scrofula, and wherever the union of quinia with a chalybeate is indicated. The dose is from three to five grains, three times a day, either in solution, or in the form of pill.

FERRI ET SALICINIAE TARTRAS. *Ferrotartrate of Salicin. Tartrate of Iron and Salicin.*

Preparation.—Take of Crystallized Tartaric Acid, Distilled Water, each, by weight, *two ounces*; moist Hydrated Sesquioxide of Iron, pure Salicin, of each, *a sufficient quantity*. Boil the Tartaric Acid and the Distilled Water together in a glass or platina vessel; as soon as the Acid is dissolved, add the Iron as long as the fluid will dissolve it. Heat the mixture until the deep blood-red fluid becomes clear, and then add the Salicin until the fluid ceases to dissolve it. Evaporate the solution by means of gentle heat, to the consistence of thick syrup, and spread it in thin layers on glass, to dry.

History.—This salt was first prepared by Professor J. M. Sanders. Although Salicin appears to be a neutral substance, still, prepared according to the above process, it enters into combination with the other agents, forming a compound which possesses the active virtues of the Salicin in a remarkable degree. It is *incompatible* with astringent vegetable infusions, strong acids, alkalies, and their carbonates.

Properties and Uses.—Similar to those of the Ferrotartrate of Quinia. In the hands of several physicians of the South, this preparation has been found equal to the analogous one of Quinia in intermittent fevers. The dose is from three to ten grains, three times a day, either in solution or in the form of pill.

FERRI FERROCYANURETUM. *Ferrocyanuret of Iron. Pure Prussian Blue. Prussiate of Iron.*

Preparation.—Take of Sulphate of Iron, *four ounces* ; Sulphuric Acid *three fluidrachms and a half* ; Nitric Acid *six fluidrachms* or a sufficient quantity ; Ferrocyanuret of Potassium *four ounces and a half* ; Water *two pints*. Dissolve the Sulphate of Iron in a pint of the Water, and having slowly and carefully added the Sulphuric Acid, boil the solution. Pour into it the Nitric Acid gradually and in small portions, boiling the liquid for a minute or two after each addition, until a dark color is no longer produced ; then allow it to cool. Dissolve the Ferrocyanuret of Potassium in the remaining pint of Water, and add this solution gradually to the first liquid, agitating the mixture after each addition ; then pour it upon a filter. Wash the precipitate with boiling water until the washings pass tasteless. Lastly, dry it and rub it into powder.—*U. S.*

History.—In the above process, the Sulphate of Iron (protoxide) is acidulated with sulphuric acid, and then, on the addition of nitric acid is changed into the tersulphate of iron (sesquioxide). The saturating power of the sesquioxide over the protoxide, is increased by the addition of the sulphuric acid, and thus a precipitate of the subsulphate of the sesquioxide is prevented. By the addition of the solution of the ferrocyanuret of potassium to that of the tersulphate of the sesquioxide of iron, a decomposition ensues ; three equivalents of the former, and two of the latter are mutually decomposed, giving rise to one equivalent of Prussian blue, which precipitates, and six equivalents of sulphate of potassa, in solution. Prussian blue contains the elements of six equivalents of water, and the salt is decomposed when these are separated. It may therefore, as a hydroferrocyanate of the sesquioxide of iron, be represented by the formula $3 \text{Cfy H}_2, \text{Fe}_4 \text{O}_6$; and the anhydrous compound, which contains nine equivalents of cyanogen, and seven of iron, by $3 \text{Cfy}, 4 \text{Fe}$. Gregory gives as the true formula of Prussian blue, $\text{Cfy}_3 \text{K}_6 + \text{Fe}_4 \text{Cl}_6 = 6 \text{K Cl} + \text{Cfy}_3 \text{Fe}_4$.

When manufactured on a large scale, it is obtained by fusing in an iron vessel, animal matter, as dried blood, horn, hair, etc., with equal parts of carbonate of potassa ; throwing the mass when cold, gradually into twelve or fifteen times its weight of water, and constantly stirring for half an hour ; then filtering through linen, and adding to the clear solution, a mixture of two parts of alum and one of the sulphate of protoxide of iron, in solution. Carbonic acid is evolved with effervescence, and a blackish-brown precipitate is thrown down in abundance, which is

washed by means of a large quantity of water, every twelve hours. These washings last for nearly a month, and the precipitate changes successively to greenish-brown, bluish, and deep blue. It is then drained upon a cloth, divided into cubical masses and dried. As prepared in this manner, it is impure, and unfit for medicinal purposes. It always contains a portion of alumina, uncombined sesquioxide of iron, and ferrocyanide of potassium.

Pure Prussian Blue is of a rich deep blue color, tasteless, and insoluble in water and alcohol. Diluted acids do not act on it, but the strong acids decompose it, with a variety of phenomena. The alkalies also decompose it, forming ferrocyanates. At a red heat it takes fire, burning slowly, and yielding sesquioxide of iron. When Prussian blue is boiled with diluted muriatic acid, filtered, and ammonia added to it, no precipitate takes place if the drug be pure—should one ensue however, the article is impure.

Properties and Uses.—Prussian Blue is tonic, sedative, and febrifuge, and is much employed in febrile diseases, by Eclectics, in conjunction with sulphate of quinia; it was introduced to the profession for this purpose, by Professor I. G. Jones, formerly one of my colleagues in the Eclectic Medical Institute, Cincinnati, who has used it with immense success, and who does not regard febrile or inflammatory symptoms in its administration, provided the disease be, in the least degree, of a periodical character. It is now successfully used in intermittent, congestive, bilious, and typhoid fevers, especially during the remissions, and also in typhoid pneumonia; the dose is three or four grains, combined with the same quantity of sulphate of quinia, and which is to be repeated every three, four, or five hours, according to the nature of the case. Prussian blue, or as more commonly called among physicians, Prussiate of Iron, has likewise been successfully used in diarrhea, summer complaint of children, pertussis, dyspepsia, epilepsy, hysteria, chorea, and facial neuralgia. The dose is usually from one to five grains, three times a day.

FERRI IODIDUM. *Iodide of Iron.*

Preparation.—Take of Iodine *two ounces*; Iron Filings *one ounce*; Distilled Water *a pint and a half*. Mix the Iodine with a pint of the Distilled Water, in a porcelain or glass vessel, and gradually add the Iron Filings, stirring constantly. Heat the mixture gently, until the liquid acquires a light greenish color; then filter, and after the liquid has passed, pour upon the filter the remainder of the Distilled Water boiling hot. When this has passed, evaporate the filtered liquor at a temperature not exceeding 212° , in an iron vessel, to dryness. Keep the dry Iodide in a closely stopped bottle.—*U. S.*

History.—In this process, iron is made to combine with iodine by means of water; when the iron is added to the liquid, it is at first red or orange-colored, but as soon as all the iodine has united with the iron by the application of heat, it changes to a greenish color, which is a solu-

tion of the iodide of iron, and yields the salt by evaporation. The iodine unites with about half its weight of iron. In its preparation according to the above formula, the iron is rapidly oxidated at the expense of the water, the protoxide being formed; while the hydrogen of the water combines with the iodine to form hydriodic acid. The result is a solution of hydriodate of protoxide of iron, or, according to some chemists, a solution of protiodide of iron, which is believed to be the best preparation for medicinal use. It is very difficult to procure this salt perfectly pure, on account of the tendency of the solution to absorb oxygen, which partly converts it into an iodide of the sesquioxide instead of the protoxide of iron; this action is nearly overcome by the evaporation to dryness being effected in an iron vessel.

Iodide of iron has a crystalline or irregularly foliated texture, according to its method of preparation, is sometimes of a dark grayish-black metallic appearance, but, when made according to the above formula, is greenish-black, and has a strong styptic, chalybeate taste. When exposed to the air, it deliquesces rapidly, sesquioxide of iron separating. At a moderate heat it fuses, and becomes, on cooling, an iron-gray, opaque, crystalline mass, having a metallic luster. If the heat be higher the protiodide parts with iodine in violet fumes, until the sesquioxide of iron alone remains. Iodide of Iron is very soluble in Water or Alcohol. If the solution be evaporated over quicklime, with as little contact of air as possible, and without artificial heat, large, transparent, tabular crystals of a pale yellowish-green color may be obtained. The anhydrous salt consists of one equivalent of Iodine 126.3, and one of iron $28=154.3$. The crystallized salt contains in addition five equivalents of water $45=199.3$. The formula of the anhydrous salt is Fe I , that of the crystallized $\text{Fe I}+5\text{HO}$. It is *incompatible* with alkalies and their carbonates, lime-water, and with all other substances by which sulphate of iron is decomposed. Its solution may be kept from decomposition, by placing in it a coil of iron wire.

Properties and Uses.—Iodide of Iron is a tonic, alterative, diuretic and emmenagogue, and influences the system more like the ferruginous salts than those of iodine. It improves the appetite, invigorates the digestive organs, blackens the alvine evacuations with a diminution of their fetor. Sometimes it acts as a laxative, but more generally as a diuretic. It has been efficaciously used in scrofula, chlorosis, secondary syphilis, amenorrhea, chronic rheumatism, chronic cutaneous diseases, leucorrhea, asthenic dropsy, old visceral engorgements, atonic dyspepsia, and in all cases where there is torpor in the system of nutrition, where there is paucity of red globules in the blood, and the fluid is too thin. On account of its tendency to decomposition when exposed to the air, it should always be given in solution. (*See Liquor Ferri Iodidi.*) It has, however, been given in pill form, being protected from deleterious agencies by the use of honey and tragacanth. The Liquor Ferri

Iodidi, evaporated to a proper consistence for making pills, would probably form a better mode of administering this salt in a solid state, than when made by the above process. (*See Pilulæ Ferri Iodidi.*) The dose of Iodide of Iron is three grains, three times a day, gradually increased to eight or ten grains.

FERRI LACTAS. *Lactate of Protoxide of Iron. Lactate of Iron.*

Preparation.—Take of Lactate of Lime *twelve and a half ounces*; pure Crystallized Sulphate of Protoxide of Iron *eight and a half ounces*; Boiling Water, cold Distilled Water, of each, *sixty two and a half ounces* by weight; Lactic Acid *a sufficient quantity*. Dissolve the Lactate of Lime in the Boiling Water; also dissolve the Sulphate of Iron in the cold Distilled Water; then filter each of these solutions, mix them in a matrass, acidulate slightly with Lactic Acid, and heat in a salt-water bath, stirring frequently until the double decomposition is completed. Then filter to separate the Sulphate of Lime, which precipitates, and evaporate rapidly to one-half, either in an iron vessel, or in a porcelain capsule containing a few Turnings of Iron. Filter again, and set aside to crystallize; and having washed the Crystals of Lactate of Iron in a funnel with a little Alcohol, dry them on bibulous paper.

History.—Lactic Acid, according to the experiments of Bernard and Barreswil, exists in a number of the secretions of the human body, and especially in the gastric juice; it has therefore been supposed by medical men, that as this acid in its action on the salts of iron taken into the stomach, may convert them into a lactate, this salt already formed might prove a valuable agent; hence the preparation of Lactate of Iron, introduced to the profession by Gélis and Conté. When pure, lactate of iron is in very white, crystalline plates, nearly permanent in the air, sparingly soluble in water, and its solution quickly changing to yellow, from higher oxidation of the iron. It has an acid reaction, and a mild chalybeate taste, and dissolves in forty parts of boiling water. If the powder is yellowish or greenish-white it is impure. It is liable to adulteration, and on this account should always be purchased in crystalline plates, and in no other form.

The Lactate of Lime used in the above process, may be made as follows: Add to *two pints* of Skim-milk, diluted with twice its bulk of Water, and contained in an earthen pan, *sixty-four drachms* of Powdered Lactin, (*sugar of milk*), and *fifty-one drachms* of Powdered Chalk. Allow the whole to ferment for eleven or twelve days, at a temperature of from 80° to 90°, supplying water as it evaporates. Transfer the liquor to a capsule, heat it gradually to boiling, and stir it constantly. Boil for a quarter of an hour to coagulate casein, allow the insoluble matters to subside, and strain the liquid through flannel. The clear liquid is a solution of Lactate of Lime—which may be concentrated to dryness. The casein of the milk, in this operation, acting as a ferment, converts

the Lactin of the Milk, and the Lactin which has been added, into Lactic Acid. This result would not ensue, were it not for the addition of Chalk, which saturates the Lactic Acid as it becomes formed, and prevents it from uniting with the casein, whereby the power of the latter as a ferment would be destroyed.

Properties and Uses.—Lactate of Iron is considered a valuable chalybeate tonic. Its use effects a decided improvement in the appetite, and in chlorosis, and anemic conditions it has been found very efficacious. The dose is one or two grains, repeated at intervals and gradually increased. As much as twelve or even twenty grains have been given in the course of the day, with good results. It may be used in the form of lozenge, pill, or solution. The lozenge may be made of one grain of the Lactate to twelve of Sugar; the pill, of one grain to the same weight of Liquorice Root, and sufficient Honey. A syrup is made by rubbing Lactate of Iron *a drachm*, with White Sugar *six ounces*, until it is all in fine powder; then dissolve the mixture quickly in Boiling Water, distilled, *six and a half fluidounces*. Pour the solution into a matrass placed on a sand-bath, and add to it *six and a half ounces* of White Sugar, in small pieces. When the Sugar is dissolved, filter, and as soon as cold, pour the syrup into bottles and keep them well closed. The syrup is of a light amber color, and contains about four grains of the salt to the fluidounce. The dose is from two to four fluidrachms.

FERRI OXIDUM HYDRATUM. *Hydrated Sesquioxide of Iron. Hydrated Peroxide of Iron. Hydrated Oxide of Iron.*

Preparation.—Take of Sulphate of Iron *four ounces*; Sulphuric Acid *three fluidrachms and a half*; Nitric Acid *six fluidrachms*, or a sufficient quantity; Solution of Ammonia *a sufficient quantity*; Water *two pints*. Dissolve the Sulphate of Iron in the Water, and, having added the Sulphuric Acid, boil the solution; then add the Nitric Acid in small portions, boiling the liquid for a minute or two after each addition, until the Acid ceases to produce a dark color. Filter the liquid, allow it to cool, and add Solution of Ammonia in excess, stirring the mixture briskly. Wash the precipitate with Water until the washings cease to yield a precipitate with Chloride of Barium, and keep it in close bottles with sufficient Water to cover it.—*U. S.*

History.—In the above process, the Sulphate of Protoxide of Iron is first converted into the tersulphate of the sesquioxide, the same as in the preparation of pure Prussian Blue; the addition of ammonia in excess, after this change has been effected, causes the sesquioxide just formed to be precipitated in the hydrated state, and which is freed from any adhering sulphate of ammonia, by the washings, repeated until the barytic salt no longer causes a precipitate. The preparation should then be kept under water in close bottles, as the most convenient method for use when required.

Hydrated Oxide of Iron, as prepared by the formula given, is a soft, moist, reddish-brown magma. When dried at a heat not exceeding 180° , and then pulverized, a reddish-brown powder is obtained, not influenced by the magnet, and which is the sesquioxide in the form of hydrate, containing about 18 per cent. of water, and which is soluble in muriatic acid without effervescence. A red heat drives off the combined water, and it then becomes the anhydrous sesquioxide, which is not so readily soluble in acids, and having no antidotal effect becomes unfit for medical use. The hydrated oxide of iron consists of one equivalent of sesquioxide 80, and two of water $18=98$, and is represented by the formula $\text{Fe}_2\text{O}_3 + 2\text{HO}$.

Properties and Uses.—This preparation, as with other Chalybeates, possesses tonic properties. But it is principally used in cases of poisoning by arsenic, in which it proves a valuable antidote. When this hydrated oxide of iron is placed into an aqueous solution of arsenic, it removes the arsenious acid so thoroughly, forming an insoluble substance, that even sulphureted hydrogen will not indicate the presence of the poison. This insoluble substance, formed by a transfer of oxygen from the oxide to the acid, is subarsenate of protoxide of iron. The hydrate should be used in the moist or pulpy state, and in doses of a tablespoonful to an adult, or a dessert spoonful to children, which must be repeated every five or ten minutes, until relief is obtained. Twelve times the amount of arsenic swallowed, should be given of this preparation of iron, and as it is a harmless article, even more may be advantageously administered. Of course, the sooner it is given after the poison has been taken, the more prompt and efficacious will be its action. Amorphous hydrated oxide of iron, when long kept in water, becomes crystalline, loses half its water of crystallization, and is much less easily soluble in weak acids; consequently, it is of some importance in cases of poisoning by arsenic, that it be recently made. It is recommended to remake it every six months from the old oxide, by dissolving it in muriatic acid, and re-precipitating it with ammonia. The dry hydrate rubbed up with water, is much less efficient than the moist. As a tonic, it may be employed in doses of from five to twenty grains.

In relation to this uniformly successful antidote to poisoning by arsenious acid, Prof. W. Procter, Jr., has recently furnished a formula which is easily executed, and which furnishes a concentrated solution of the ter-sesquisulphate of iron of known strength, so that the operator can graduate the precise quantity of oxide by means of his measure glass. The formula, together with Prof. P.'s remarks are given entire: Take of Proto-sulphate of Iron, well crystallized, *sixty-four ounces*, Troy; Sulphuric Acid *seven fluidounces*; Nitric Acid, sp. gr. 1.38, *twelve fluidounces*; Water *a sufficient quantity*.

Reduce the Sulphate of Iron to moderately fine powder in an iron mortar, mix together the Acids and five fluidounces of Water, put the mixture in a large porcelain capsule on the sand-bath or other regular source of heat, and add the powdered Sulphate, about two ounces at a time, stirring after each addition, till the effervescence ceases, until all has been added, and the elimination of nitrous fumes has ceased. In the absence of a porcelain capsule and sand-bath, the operator may use a gallon glass jar, supported in a vessel of Boiling Water; in either case, the vessel should be large enough to allow for active effervescence, and it is hardly necessary to say that the operation should be performed under a chimney-hood, or in the open air, to avoid the noxious fumes of Nitrous Acid. The dense solution thus obtained should then be diluted with Water until it measures four and a half pints, (wine measure,) and then filtered through thick muslin.

Solution of Ter-sulphate of Iron thus prepared, has a dark, reddish-brown color in quantity, the specific gravity of 1.587 at 60° F., but little if any odor, a powerful styptic taste, and mixes readily with Water, so as to form a solution with more color in proportion to its dilution than the strong liquid. Each fluidounce of this solution contains a fraction more than 120 grains of Sesquioxide; each fluidrachm 15 grains, and each minim a quarter of a grain; and as it is equally applicable for preparing the Oxide for chemical as for antidotal purposes, this correspondence of weights with measures gives great facility in calculating any precise quantity desired.

It is this solution which I have proposed should be kept by every apothecary as the source of Hydrated Sesquioxide of Iron. Its strength is such that it requires about an equal measure of commercial solution of Ammonia (sp. gr. .940,) to decompose it. The apothecary who is suddenly called upon for the antidote will proceed in the following manner:

Take of Solution of Ter-sulphate of Iron *half a pint*; Solution of Ammonia *half a pint* (or a sufficient quantity); Water *a sufficient quantity*. Pour the Solution of Iron into a half gallon jar, add two pints of Water, and then add the Ammonia, stirring constantly until in slight excess. This is known when, after displacing the air in the jar by blowing, it continues to smell slightly of Ammonia. The contents of the jar are then thrown on a piece of strong muslin, previously well moistened, and the liquid, holding in solution Sulphate of Ammonia, expressed from it as quickly as possible, until the Oxide remains in the cloth of a pasty consistence. The cloth is then opened on a dish, Water added and incorporated with the Oxide by means of a spatula, and then again expressed. If the demand is urgent, the Oxide may be sent without further washing, if not urgent, the washing may be repeated twice more. It is then quickly removed by a spatula from the cloth to a quart mortar, and

Water mixed with it by trituration, until it measures a pint, when it should be poured into a wide-mouthed bottle, corked, and the following label attached, viz :

HYDRATED SESQUIOXIDE OF IRON.

(*Ferri Oxidum Hydratum U.S. Pharm.*)

Antidote to Arsenic.

This preparation consists of Hydrated Sesquioxide of Iron and Water, in such proportion that each tablespoonful contains thirty grains of the dry Oxide; and is intended to neutralize the poisonous effects of *Arsenious Acid*, or common *White Arsenic*, when taken into the stomach. It is well to precede the administration of this antidote by an active emetic of Ipecacuanha or of Mustard, so that any undissolved arsenic may be thus mechanically removed, if possible. If, however, this has not been done before obtaining the antidote, no time should be lost in giving it. The patient should take a tablespoonful for a dose every five or ten minutes, but if vomiting should intervene, let a dose be given immediately after each attack, unless otherwise directed by the physician in attendance.

When the poisoning has been caused by *Arsenite of Potassa*, (Fowler's Mineral Solution) *Soda*, or *Ammonia*, or by the Salts of *Arsenic Acid*, after giving the first dose add six tablespoonfuls of Vinegar to the contents of the bottle, and shake it a few minutes, until the acidity is neutralized, and then give it as above.

When the Oxide is intended for other ferruginous preparations, as, for instance, Citrate of Iron, it should be washed by displacement on a cloth filter, till the washings cease to precipitate Chloride of Barium. The small amount of Sulphate of Ammonia remaining in the Oxide, when prepared hurriedly as above, is of no account in a case of poisoning. The detail in the above label is not objectionable, as it will be often of use even to the experienced physician, not to speak of the very many who have had little if any experience in poisoning cases, and will likewise enable any person of ordinary ability to administer the antidote without loss of time. When it is so easy to be prepared for these occasions, every apothecary who has a proper regard for his reputation and duty, will provide the means above detailed, and be ever ready.

FERRI OXIDUM NIGRUM. *Black Oxide of Iron.*

Preparation.—Take of Sulphate of Iron *six ounces*; Sulphuric Acid (commercial) *two fluidrachms and two fluid scruples*; Pure Nitric Acid *four fluidrachms and a half*; Stronger Aqua Ammoniae *four fluidrachms and a half*; Boiling Water *three pints* (Imperial measure). Dissolve half the Sulphate in half the Boiling Water, and gradually add the Sulphuric Acid; boil; add the Nitric Acid by degrees, boiling the liquid after each addition briskly for a few minutes. Dissolve the rest of the Sulphate in the remainder of the Boiling Water; mix the two solutions thoroughly; and immediately add the Ammonia in a full stream, briskly stirring the mixture at the same time. Collect the black powder on a calico filter; wash it with Water till the water is scarcely precipitated.

by a solution of Nitrate of Baryta, and dry it at a temperature not exceeding 180° .

History.—In the above process, the first half of the sulphate of iron, after its solution in the water and acidulation with sulphuric acid, becomes, on the addition of the nitric acid, changed into the tersulphate of the sesquioxide of iron. The sulphuric acid is added for the same purpose as mentioned under Ferri Ferrocyaneum, *which see*. The remaining half of the sulphate, dissolved in the balance of the water, forms a solution of the sulphate of the protoxide of iron. On mixing these two solutions, a compound one is formed, of sulphate of protoxide and sulphate of sesquioxide of iron; ammonia added to this, precipitates simultaneously the protoxide and sesquioxide, which chemically combine and form the Black Oxide.

The Black Oxide of Iron is of a dark grayish-black color, presenting a shining fracture, when a piece dried in mass is broken, is permanent in the air, and is strongly attracted by the magnet. It dissolves without effervescence in muriatic acid, from which it may be precipitated by ammonia. Heated in close vessels it parts with water, undergoing no other change; but heated in open vessels, it absorbs oxygen, and soon passes entirely to the state of a brownish-red sesquioxide. It is composed of two equivalents of protoxide and one of sesquioxide of iron, and two of water, its formula being $2 \text{ Fe O} + \text{Fe}_2 \text{ O}_3 + 2 \text{ HO}$.

The scales which are struck from red-hot iron by the blacksmith's hammer, the *Æthiops Martis* of the old *Materia Medica*, consist of chemical combinations of the protoxide and sesquioxide of iron in variable proportions. They are prepared for medicinal use by washing them, freeing them from impurities by the magnet; triturating them, and separating the fine powder by the method directed for making prepared chalk. It is, however, inferior in medicinal virtue to the black oxide prepared as above.

Properties and Uses.—This is a valuable chalybeate, possessing the advantages of uniformity of composition and unchangeableness when exposed to air and moisture. Its dose is from five to twenty grains, two or three times a day.

FERRI PHOSPHAS. *Phosphate of Iron.*

Preparation.—Take of Sulphate of Iron *five ounces*; Phosphate of Soda *six ounces*; Water *a gallon*. Dissolve the Sulphate of Iron and Phosphate of Soda, each separately, in four pints of the Water; then mix the solutions, and set the mixture aside, that the powder may precipitate; lastly, having poured off the supernatant liquor, wash the Phosphate of Iron with hot water, and dry it with a gentle heat.—*U. S.*

History.—In the above process a double decomposition takes place, the sulphuric acid of the sulphate of iron is set free, and combines with

the soda, forming a solution of sulphate of soda; while at the same time, the phosphoric acid of the phosphate of soda, also being set free, unites with the protoxide of iron, forming a precipitate of phosphate of iron.

Phosphate of Iron, when prepared from a perfect sulphate of the protoxide, is at first of a white color, but from absorption of oxygen, it soon becomes bluish-white. It is usually met with in the form of a powder, of a bright slate-color, insoluble in water, but soluble in dilute muriatic acid.

Properties and Uses.—Phosphate of Iron is a valuable chalybeate tonic. It has been recommended as a remedy in cancer, to be used internally, and also applied to the diseased part; likewise to restore and invigorate the virile powers. Professor Z. Freeman prefers it, in many instances, to the prussiate of iron in febrile diseases, and has derived marked advantage from it in this class of maladies. The dose is from one to ten grains, three times a day.

Dr. Routh has met with much success in some cases of anemia and debility, brought on by venereal or other excesses, over-study, and depressing diseases, by the use of a new preparation of Phosphate of Iron, which he has found better adapted for a speedy cure than other preparations of iron; it has likewise been of much benefit in cases of virile weakness from onanism, or other causes. It is prepared by adding as much phosphate of iron as the monobasic phosphoric acid in a boiling state would take up, and allowing it to cool. The proportions will be found nearly two of acid to one of the phosphate. The solution obtained is of a semitransparent, greenish or slaty hue, which hardens on exposure to the air for a day; but mixed with liquorice powder or flour, it can be at once made up into pills. The compound is soluble in any proportion of water, and free from any nauseous, inky taste. It is not yet analyzed, to know whether it is a superphosphate of iron, or a mere solution of the phosphate in the acid. It does not gripe or constipate, and has proved beneficial in cases of debility, where there is a prevalence of nervous symptoms, or a large quantity of phosphates voided by urine. Dose, one or two grains, three times a day—in some instances combined with an equal proportion of phosphate of quinia.

FERRI PULVIS. *Powder of Iron. Reduced Iron. Iron by Hydrogen.*

Preparation.—Take of Subcarbonate of Iron, previously calcined in an open vessel, *two pounds and a half*, or a convenient quantity. Into a wrought-iron reduction tube, of about four inches in diameter, introduce the Subcarbonate, contained in an incomplete sheet-iron tube, open at both ends, made by bending the iron into the form of a cylinder, and of such a size as to fill loosely about seven-eighths of the reduction-tube. Place the reduction-tube longitudinally in an oblong charcoal-furnace; and, by means of a self-regulating generator of Hydrogen,

pass through it a stream of that gas, previously purified by bubbling successively through solution of subacetate of lead, diluted with three times its volume of water, and through milk of lime, severally contained in half-gallon bottles, about one-third filled. Connect with the further extremity of the reduction-tube a lead tube bent so as to dip into water. Make all the junctions air-tight by appropriate lutes; and, when the Hydrogen has passed long enough to fill the whole of the apparatus to the exclusion of atmospheric air, light the fire and bring that part of the reduction-tube occupied by the Subcarbonate to a dull-red heat, which must be kept up so long as the bubbles of Hydrogen, breaking from the water covering the orifice of the lead tube, are smaller than those passing through the milk of lime. When the reduction is completed, remove the fire, and allow the whole to cool to the ordinary temperature, keeping up, during the refrigeration, a moderate current of Hydrogen through the apparatus. Lastly, withdraw the reduced Iron from the reduction tube, detach it from the sheet-iron tube, and, having powdered it, keep it in well-stopped bottles. When two pounds and a half of Subcarbonate of Iron are operated on, the process occupies from five to eight hours.—*U. S.*

History.—This preparation is a fine powder of metallic iron, procured by reducing the sesquioxide of iron by hydrogen, at a dull-red heat. The subcarbonate of iron is calcined, which removes its water, and is then subjected to the reducing influence of hydrogen, purified in the manner named. The oxygen of the sesquioxide unites with the hydrogen, forming water, and the iron is left in its metallic state. Much care is necessary in preparing this article. If the subcarbonate of iron has not been freed from sulphate of soda by thorough washings, a sulphuret of sodium will be formed, and the pulverized iron spoiled; if the heat be below dull redness, some of the oxide will escape reduction; if it exceed that point, the reduced iron will agglutinate and be difficult to powder. Souberain and Dublanc have given full directions for the manufacture of powder of iron, including the purifying of the hydrogen, the construction of the furnace, regulation of the heat, avoiding explosions, etc., and which may be found in the *American Journal of Pharmacy*, Vol. XVIII, page 303. Prof. Procter, in Vol. XIX, page 11 of the same journal, has made known some valuable improvements in their process. To both of which the manufacturer is referred.

Powder of Iron, when fully deoxidized, is of an iron-gray color, and tasteless. When black it is imperfect, and should be rejected. Dilute acids cause with it an evolution of hydrogen with effervescence. Placed on an anvil and struck with a smooth hammer, a brilliant metallic scale is formed. It oxidizes rapidly, and hence should be kept in dry and well-closed bottles.

Properties and Uses.—A valuable tonic, and is considered to be the best form of metallic iron for medicinal employment. It may be used

in chlorosis, anemia, and all diseases in which the coloring matter of the blood is deficient. The dose is from three to six grains, four or five times a day, and is best given in the form of pill.

FERRI SESQUIOXIDUM. *Sesquioxide of Iron. Red Oxide of Iron.*

Preparation.—Expose Sulphate of Iron to heat, until the water of crystallization is expelled. Then roast it by an intense fire so long as acid vapors arise. Wash the Sesquioxide until the washings, when examined by litmus, appear free from acid. Lastly, dry it on bibulous paper.

History.—Sesquioxide of Iron is a reddish-brown, tasteless, insoluble powder, called *Colcothar*. It is an anhydrous sesquioxide of iron, and is soluble in muriatic acid.

Properties and Uses.—It possesses tonic and somewhat styptic properties, and is used principally in strumous and neuralgic affections, in combination with extract of conium. The dose is from two to eight grains, three or four times a day.

The *Red or Styptic Powder* is prepared by merely submitting sulphate of iron to a red-heat, and continuing it until a reddish substance is formed; it undoubtedly contains a portion of acid. It is powerfully astringent and styptic, and is used as an application to bleeding piles, and external hemorrhages; it is usually applied in the form of ointment, and may also be given internally for the same purposes.

FERRI SUBCARBONAS. *Subcarbonate of Iron. Precipitated Carbonate of Iron.*

Preparation.—Take of Sulphate of Iron *eight ounces*; Carbonate of Soda *nine ounces*; Boiling Water *a gallon*. Dissolve the Sulphate of Iron, and Carbonate of Soda, each, separately, in four pints of the Water; then mix the solutions; and having stirred the mixture, set it by that the powder may subside. Lastly, having poured off the supernatant liquor, wash the Sub-carbonate of Iron with hot water, wrap it in bibulous paper, and dry it with a gentle heat.—*U. S.*

History.—In the above process a double decomposition takes place; the sulphuric acid of the sulphate of iron unites with the soda forming a solution of sulphate of soda; while the carbonic acid of the carbonate of soda, at the same time, unites with the iron, forming a precipitated hydrated carbonate of protoxide of iron. During the washing and drying, the precipitate absorbs oxygen and parts with nearly all its carbonic acid, and forms a sesquioxide of iron with a small portion of carbonic acid present. Hence the name, Subcarbonate of Iron, is given to it, to distinguish it from the sesquioxide, made by calcining sulphate of iron until all its acid is removed. If carbonate of potassa be used instead of soda, the sulphate of potassa formed will be found less soluble, and not so easily removed by washing.

The powder of subcarbonate of iron, is of a reddish color, and has an unpleasant, slightly styptic taste; it is insoluble in water, but readily soluble in muriatic acid, evolving carbonic acid with effervescence. Ammonia or potassa precipitates the sesquioxide of iron from its solution in muriatic acid, and when properly prepared, sulphureted hydrogen, or ferrocyanuret of potassium added to the supernatant liquor, should give no signs of the presence of any metal in solution. Subcarbonate of iron, is a hydrated sesquioxide, containing a small amount of protoxide and carbonic acid. It is *incompatible* with acids and acidulous salts.

Properties and Uses.—Subcarbonate of iron is tonic, alterative, and emmenagogue. In large doses it may produce a sense of weight or fullness at the stomach, or a slight nausea, but no other unpleasant effects. The stools are colored black by its use. It is one of our best chalybeates, and has been successfully used in neuralgia, especially when connected with functional derangement of the stomach, chorea, chlorosis, and those leucophlegmatic states of the system in which the blood is deficient in coloring matter. Sometimes used in intermittent fever, when connected with an anemic condition or where the nutritive functions are deranged. In chronic diarrhea and dysentery, enlargement of the liver and spleen, epilepsy, dropsy, cancer, scrofula, and diseases of the urinary organs, connected with debility, it has been successfully used. The dose is from five grains to two drachms, three times a day; no nicety need be observed in the dose.

It is not so powerful an antidote in poisoning by arsenic, as the hydrated sesquioxide of iron in the form of magma, yet it should always be used, until the latter can be obtained.

Off. Prep.—Tinctura Ferri Chloridi.

FERRI SULPHAS. *Sulphate of Iron. Sulphate of Protoxide of Iron. Green Vitriol. Copperas.*

Preparation.—Take of Iron Wire, cut in pieces, *twelve ounces*; Sulphuric Acid *eighteen ounces*; Water *one gallon*. Mix the Sulphuric Acid and Water, and add the Iron Wire; then heat the mixture until effervescence ceases. Pour off the solution, and having added half a drachm of Sulphuric Acid, filter through paper, allowing the lower end of the funnel to touch the bottom of the receiving vessel. Evaporate the filtered liquor in a matrass until sufficiently concentrated, then set it aside in a covered vessel to crystallize. Drain the crystals in a funnel, dry them on bibulous paper, and keep them in closely stopped bottles.—*U. S.*

History.—When concentrated sulphuric acid is in contact with iron, it does not readily act upon it; but if it be diluted with water, the oxygen of the water changes the iron into a protoxide; the sulphuric acid unites with this, forming a solution of sulphate of protoxide of iron, and hydrogen is set free. An excess of iron is advantageous, as it secures

a perfect sulphate. The addition of a small portion of sulphuric acid previous to filtering the solution, is for the purpose of holding in solution any sesquioxide that may have been formed, and thereby enabling the salt to crystallize on evaporation, entirely free from the sesquioxide; and the direction to have the funnel come in contact with the bottom of the receiving vessel, is for the purpose of avoiding, as much as possible, the contact of air, which favors the conversion to sesquioxide. For the same reason, after concentration of the solution by evaporation, the vessel in which it crystallizes should be kept covered.

Sulphate of iron is an efflorescent salt, forming transparent, pale bluish-green crystals, with the shape of oblique rhombic prisms. It possesses a strong acid, astringent taste, and an acid reaction. Exposed to the air, it absorbs oxygen, and becomes finally covered with an efflorescence of a yellow color, which is the insoluble subsulphate of the sesquioxide. When the salt is entirely green, or approaches green more than blue, it is an indication of the presence of some sesquioxide. It is soluble in water, but is insoluble in alcohol. Twice its weight of cold, and three-fourths its weight of boiling water are required to dissolve it, and the solution is bluish-green; but it soon becomes green and then reddish, when exposed to the air, in consequence of the absorption of oxygen, which precipitates a small amount of sesquisulphate of the sesquioxide of iron. A few drops of sulphuric acid added to the solution prevents, or greatly retards this change. Exposed to a moderate heat, it fuses in its water of crystallization, six-sevenths of which passes off, leaving a grayish-white anhydrous salt. If the temperature be increased to a red heat, it parts with its acid, and is changed into the anhydrous sesquioxide of iron, called *Colcothar*. It is *incompatible* with the alkalies, and their carbonates, soaps, lime-water, the chlorides of barium and calcium, the borate and phosphate of soda, nitrate of silver, acetate and subacetate of lead, and astringent vegetable infusions; with the latter of which, it forms with their tannic and gallic acids, a black substance of an inky nature. The impure commercial sulphate of iron is unfit for medicinal purposes. Crystallized sulphate of iron, consists of one equivalent of acid 40, one of protoxide 36, and seven of water 63=139; its formula is $\text{Fe O} + \text{S O}_3 + 7 \text{HO}$.

Copper and Zinc are sometimes present in sulphate of iron; copper may be detected by dipping into the solution a bright, polished plate of iron, which becomes covered with a brown cupreous crust, deposited from the solution. If a solution of the salt be sesquioxided by boiling with nitric acid, and the iron be precipitated by an excess of ammonia, and then filtered, it will be of a blue color if copper be present; but if zinc be present, the white oxide will separate in flakes, on applying heat to the solution and boiling to drive off the ammonia. Pure sulphate of iron is precipitated from its solution by ferrocyanuret of potassium, of a white color, which in the impure kinds is more or less

blue, according to the proportion of sesquioxide of iron which is present.

Properties and Uses.—Sulphate of Iron is irritant, tonic, and astringent. Nausea and vomiting, and gripings of the bowels, are apt to follow the administration of large doses; and the stomach is more or less injured by a long continued use of it. It has been used as a tonic in scrofula, dyspepsia, chlorosis, amenorrhea, and in debility following protracted diseases. In phthisis pulmonalis the following preparation has been found very serviceable; it relieves cough, assists expectoration, improves the appetite and digestive functions, and invigorates the whole system:—Take of commercial sulphate of iron six drachms; Whisky or good Holland Gin, half a pint; mix together. The dose is half a fluidrachm every two hours. As an astringent, sulphate of iron is given in diseases attended with immoderate discharges, as passive hemorrhages, colliquative sweats, diabetes, chronic mucous catarrh, leucorrhœa, gleet, etc. The dose is from one to five grains in the form of pill. In an overdose, it acts as a poison. Externally, the solution is used in eruptions of the face, chronic ophthalmia, and gleet, of various strengths, from one or two, to eight or ten grains of the salt to the fluidounce of water.

Off. Prep.—Ferri Carbonas Saccharatum; Ferri Citras; Ferri et Quiniæ Citras; Ferri Ferrocyaneum; Ferri Oxidum Hydratum; Ferri Oxidum Nigrum; Ferri Phosphas; Ferri Subcarbonas; Ferri Sulphas Exsiccatus; Ferri Valerianas; Pilulæ Ferri Carbonatis; Pilulæ Ferri Compositæ; Tinctura Ferri Acetatis.

FERRI SULPHAS EXSICCATUS. *Dried Sulphate of Iron.*

Preparation.—Expose any convenient quantity of Sulphate of Iron to a moderate heat, in a porcelain or earthenware vessel, not glazed with lead, till it is converted into a dry, grayish-white mass, which is to be reduced to powder.

History.—By this process about six-sevenths of the water of crystallization of the sulphate of iron is expelled. If the heat used should exceed 400°, the salt would become decomposed, hence it must not extend beyond it.

Properties and Uses.—Same as Sulphate of Iron; to be used in pill form. Three grains of the dried sulphate of iron are equivalent to five of the crystallized sulphate. Externally, in solution, as an astringent lotion for indolent ulcers, and as an injection in leucorrhœa, and gonorrhœa of females.

Off. Prep.—Lotio Hydrastis Composita; Pilulæ Polygoni Compositæ.

FERRI SULPHURETUM. *Sulphuret of Iron.*

Preparation.—The best Sulphuret of Iron is made by heating an iron rod to a full white-heat in a forge, applying a stick of sulphur to the end

of the rod, and allowing the fused globules of Sulphuret which form to fall into a deep vessel filled with water. These should be freed of sulphur and kept in a close vessel.

An inferior kind, but sufficiently good for pharmaceutic purposes, may be obtained by mixing thoroughly together, Sublimed Sulphur *one part*, and Iron Filings *three parts*. Heat the mixture in a covered crucible till it becomes red-hot, then remove the crucible from the fire, still keeping it covered, and allow the action to go on without any further heat.

History.—There are a number of Sulphurets of Iron, among the most important of which are the Proto-sulphuret, or Sulphuret of the protoxide; the Sesquisulphuret, or Sulphuret of the Sesquioxide, the Bisulphuret or Cubic Pyrites, and the Magnetic Pyrites, which consists of five equivalents of protosulphuret, and one of bisulphuret; this last dissolves in acids, yielding sulphureted hydrogen and a residue of sulphur. The protosulphuret, however, is the one more generally used in Pharmacy for the production of hydrosulphuric acid gas, (sulphureted hydrogen). When solid sulphur is applied to a rod of iron heated to a full white heat, the product is similar to magnetic pyrites; but when the proto-sulphuret is obtained by heating Flowers of Sulphur with Iron Filings in excess, it always contains an excess of iron. In the first instance, when sulphur is applied to white-hot iron, the metal apparently becomes hotter, the two bodies combine with the emission of brilliant sparks, the protosulphuret is instantly formed, and falls down in a fused and incandescent state, and on being received in the water, brownish-yellow globules are obtained, having a somewhat crystalline texture. When pure, the officinal sulphuret of iron furnishes a yellow powder, and is easily dissolved in diluted sulphuric or muriatic acid, evolving sulphureted hydrogen, and not leaving a residue of sulphur. As ordinarily prepared, however, it is not completely soluble in diluted sulphuric acid, and leaves a residue of uncombined sulphur. Pure protosulphuret of iron consists of one equivalent of iron 28, and one of sulphur 16.12=44.12; its formula is Fe S . The fused globules have the composition of $5 \text{ Fe S} + \text{Fe S}_2$, or according to some, $5 \text{ Fe S} + \text{Fe}_2 \text{ S}_3$.

Properties and Uses.—This preparation is employed in Pharmacy only for the production of hydrosulphuric acid gas, (sulphureted hydrogen). Diluted sulphuric or muriatic acid is added to it, in a proper vessel, and the sulphureted hydrogen is disengaged as a gas, and may be collected over warm water, or solution of salt. In this process water is decomposed, and its hydrogen forms hydrosulphuric acid, by uniting with the sulphur, while the oxygen changes the iron into a protoxide, which combines with the sulphuric acid. *Sulphureted Hydrogen* is a transparent and colorless gas, having a very offensive and peculiar smell, similar to that of putrid eggs. When respired, even although much diluted with

air, it is highly deleterious. It is combustible, burning with a bluish flame, and producing sulphurous acid gas and water. Its specific gravity is 1.178. Water absorbs two or three times its volume of the gas, and acquires its smell, and a nauseous sweetish taste; the action of the air upon the solution, gradually decomposes it, with the formation of water and deposit of sulphur. Hence, the solution should always be kept in small vials, quite full and closely stopped. Hydrosulphuric acid saturates bases, forming salts known as *Hydrosulphates*, *Sulphohydrates*, or *Hydrosulphurets*. It consists of one equivalent of sulphur 16, and one of hydrogen 1=17; its formula is HS.

The following has cured several cases of syphilis: Heat a piece of Steel to a welding heat, apply a roll of Sulphur to it, and let the drops fall in Cold Water. Pulverize these globules or drops, and add one table-spoonful to a pint of Whisky. Let the mixture macerate for a few days. The dose is a table-spoonful five or six times a day.

FERRI TANNAS. *Tannate of Iron.*

Preparation.—Take of pure Tannic Acid *nine ounces*; Precipitated Subcarbonate of Iron *forty-four ounces*; Water *a sufficient quantity*. Dissolve the Tannic Acid in sufficient water, and boil the solution, to which, while boiling, add gradually the Subcarbonate of Iron, moderately dried; agitate the solution till effervescence ceases. Evaporate the solution in a porcelain vessel, at a temperature of 176° F., until it becomes thick; then spread it on glass or porcelain to dry in a stove at 95°.

History.—Thus prepared, Tannate of Iron is in flat pieces, of a crimson color, tasteless, and insoluble in water.

Properties and Uses.—Tannate of Iron possesses tonic and astringent properties. It has been used with benefit in chlorosis, amenorrhea, chronic diarrhea, and in the diarrhea accompanying some febrile diseases, etc. The dose is two or three grains, made into pills, and gradually increased, so that in the course of a day thirty grains may be given.

FERRI VALERIANAS. *Valerianate of Iron.*

Preparation.—To clean Iron Filings, in a Wedgewood mortar, add gradually an *equal weight* of Valerianic Acid, and stir constantly. In an hour, add Distilled Water; gently warm the whole in a flask, and filter. The surface in contact with the air becomes covered over with a crystalline layer of the Valerianate; collect this, and expose as before, repeating the process as long as it continues to yield crystals. Or, it may be prepared by adding a cold solution of Valerianate of Soda to a solution of *three parts* of Sesquichloride of Iron in *one hundred* of Water. The solution of Valerianate of Soda, proper for the reaction, is made by saturating *five parts* of oily Valerianic Acid in *sixty* of Water with Carbonate of Soda, and then boiling the liquid to expel all the Carbonic

Acid. The precipitated Valerianate of Iron is washed with a little Cold Water, and dried at a temperature not exceeding 68°.

The Dublin Pharmacopœia of 1850, gives the following process for obtaining this salt: Take of Valerianate of Soda *five ounces and three drachms*, (Dublin weight); Sulphate of Iron *four ounces*, (avoirdupois); Distilled Water *one pint*, (Imperial measure). Convert the Sulphate of Iron into a tersulphate of the sesquioxide, (as directed in the formula for Prussian blue), and add Distilled Water until the solution be augmented to the bulk of eight fluidounces, (Imperial measure). Dissolve the Valerianate of Soda in ten fluidounces of the Water, and mix the two solutions cold; then, having placed the precipitate which forms, upon a filter, and washed it with the remainder of the Water, dry it, by wrapping it in bibulous paper, and allowing it to stand on a porous brick for some days. When dried, it should be kept in well stopped bottles.

History.—In this latter process after having converted the sulphate of protoxide of iron into the tersulphate of sesquioxide, a double decomposition is effected between this latter salt and the valerianate of soda, in which sulphate of soda is formed, and remains in solution, while the tervalerianate of sesquioxide of iron is precipitated. Or, three equivalents of valerianate of soda, reacting on one of tersulphate of sesquioxide of iron, result in three equivalents of sulphate of soda, and one of tervalerianate of sesquioxide of iron.

Valerianate of Iron is in the form of a loose, amorphous powder of a dark tile-red color, and having a slight taste and odor of valerianic acid. It is insoluble in cold water, soluble in alcohol, and is decomposed by boiling water, which removes its acid and leaves the sesquioxide of iron remaining. A fraudulent article is sometimes sold, consisting of tartrate or citrate of iron, to which oil of valerian has been added. It may be detected, by observing that the genuine salt gives off an odor of valerianic acid when treated with dilute muriatic acid.

Properties and Uses.—Valerianate of Iron is a nervo-tonic, and will be found serviceable in nervous disorders, hysteria, chorea, neuralgia, chlorosis, and anemic conditions with excitability or irritability of the nervous system. The dose is one or two grains, in pill form, repeated three or four times a day.

INFUSA.

Infusions.

Infusions are solutions of vegetable principles in water, effected without boiling, and to which, when not contra-indicated, some kinds of Spirit are occasionally added for the purpose of preserving them. The addition of any Alcoholic mixture is, however, only made in cases where the medicinal action of the liquor itself is desired. The almost universal method of preparing infusions is by pouring water on the vegetable

substances, previously cut or bruised, and macerating in a close vessel till cool. Sometimes a prolonged application of a low heat, by the side of a fire or otherwise, is required, for the purpose of extracting certain principles not so readily soluble by other means. When the active principle is volatile or impaired by heat, or when the vegetable contains a substance not readily soluble at a low temperature, and which it is required to avoid in the infusion, Cold Water will be found preferable to Hot.

Infusions form a very convenient mode of administering vegetable medicines, as the greater part of them are easily exhausted of their active principles in this way, without requiring to be very finely divided. The principal objection to them, is the difficulty of keeping them for any length of time, in consequence of which they require to be prepared extemporaneously, and in small quantities at a time. Mr. Alsop, however, states, that they may be preserved for months, by pouring them while boiling hot into bottles, up to the top, and forcing in corks of good quality. The water employed in making infusions should be pure, as fresh river, rain, or distilled water, instead of water from pumps, springs, or holding in solution saline principles. For the preparation of infusions, Mr. Alsop has introduced a mug or jar, having a perforated diaphragm about one-third way from the top of the pot, on which are placed the solid ingredients. The diaphragm is movable, and is supported on ledges placed on the inside of the vessel; it may be used to prepare infusions by Hot or Cold Water, or where digestion is required for some time. As the water in the jar becomes impregnated, the increased specific gravity it acquires causes it to descend, and its place is immediately supplied by fluid of less specific gravity, so that a continual circulation takes place until the whole of the soluble principles are extracted.

In making infusions with Boiling Water, starch and other principles are often taken up, whose presence disposes to acidity or moldiness, or perhaps favors reactions which materially impair the infusions; on this account percolation by Cold Water is preferable, as it avoids these inconveniences, beside which these infusions have a less tendency to decay than those made at a boiling temperature. The process of percolation or displacement by Cold Water, affords infusions of very great strength, and is preferred to any other mode; it requires, however, that the articles should be more finely powdered, as a general thing, than is customary in preparing infusions in the ordinary way. When of too much strength, the infusion may be reduced by dilution with water.

The usual rule for preparing infusions is, to add from half an ounce to an ounce of the coarsely bruised herb or root to a pint of water, of which, when prepared, the dose is from one to two fluidounces. They are better when prepared in glazed earthenware or porcelain vessels fitted with covers, than when prepared in metallic vessels, on account of a liability to chemical alteration from metallic influence, and which frequently impairs the preparation. Infusions containing acids,

or saline substances should always be prepared and kept in glass or china vessels.

In the preparation of infusions, the reactions of agents should always be kept in view. Thus—Infusion of *Chamomile flowers* yields precipitates with nitrate of silver, sulphate of iron, gelatin, yellow Peruvian bark, tincture of chloride of iron, corrosive sublimate, and the acetates of lead. Infusion of *horse-radish* becomes turbid from deposition of vegetable albumen, and speedily runs into the putrefactive fermentation in warm weather. It likewise gives precipitates with infusions of galls, and Peruvian bark, with nitrate of silver, corrosive sublimate, and the alkaline carbonates. Infusion of *cloves* affords precipitates, with the soluble salts of antimony, iron, lead, silver, and zinc, and also with lime-water. Infusion of *Cascarilla*, yields precipitates with acetate and subacetate of lead, sulphate of iron, sulphate of zinc, lime-water, nitrate of silver, acetates of lead, and infusion of galls. Infusion of *Yellow Peruvian bark* is *incompatible* with the alkalies, alkaline earths, vegetable astringents, tartaric acid, oxalic acid, and the soluble tartrates and oxalates. It also affords precipitates with other agents, which, however, do not always injure its efficacy or active principle, as corrosive sublimate, arsenious acid, tartar emetic, gelatinous solutions, soluble salts of iron, silver, and zinc, and many vegetable solutions, as those of cloves, chamomile, columbo, cascarilla, galls, horse-radish, catechu, digitalis, senna, orange peel, rhubarb, valerian, and simaruba. Infusion of *Colombo* is best prepared by exhausting with cold water, which leaves the starch behind, and then heating the infusion to the boiling point in order to coagulate the albumen, and strain. Infusion of *digitalis* affords precipitates with the acetate of lead, sulphate of iron, and infusion of Peruvian bark, etc.

As nearly all vegetable medicines are occasionally administered in the form of infusion, it would be useless to enter into an especial relation of them, further than already explained in the above general rules; they are more commonly prescribed as secondary or auxiliary measures, and are left for the nurse or family to prepare. However, there are a few compound infusions, some of which are of a spirituous nature, which it may be advisable to describe on account of their extensive employment, and superior efficacy in the diseases for which they are recommended.

INFUSUM APII COMPOSITUM. *Compound Infusion of Parsley.*

Preparation.—Take of Parsley Roots and Seeds, coarsely bruised, Subcarbonate of Iron, each, *four ounces*; Horse-radish Root, in small pieces, *two ounces*; Juniper Berries, Squill, White Mustard-seed, Mandrake Root, and Queen of the Meadow, of each, finely bruised, *one ounce*; Good Cider *six quarts*. Boil the Cider and pour it on the rest of the articles mixed together, in an earthen vessel; cover the vessel, and digest with a gentle heat for twenty-four hours.

The cider should not be hard, nor too new, but sparkling and pleasantly tart, and after digestion by heat, it should be allowed to remain upon the articles, without straining it off. By this course, the liquid becomes still further impregnated with the properties of the medicines.

Properties and Uses.—This is a most excellent preparation in several varieties of dropsy, for which alone it is used; it increases the action of the kidneys, regulates the bowels, improves the digestive functions, and promotes activity of the absorbent vessels. The dose is one or two fluidounces, three times a day. In the summer season, half the above quantity may be made at one time, as, otherwise, it becomes very sour and moldy. It should always be used immediately after its preparation.—*J. K.*

INFUSUM EPIGÆE COMPOSITUM. *Compound Infusion of Trailing Arbutus. Diuretic Compound.*

Preparation.—Take of Trailing Arbutus, Queen of the Meadow Root, Dwarf Elder Bark, Marsh-mallow Root, each, coarsely bruised, *half an ounce*; Boiling Water, good Holland Gin, of each, *one pint*; Honey *a sufficient quantity*. Pour the Boiling Water and Gin, on the plants, and digest them with gentle heat, in a close covered vessel, for six hours; then remove from the fire, strain, and add sufficient Honey to render it pleasantly sweet.

Properties and Uses.—This is a very valuable remedy in gravel, suppression of urine, high colored or scalding urine, inflammation of the urethra, and other disorders of the urinary organs. In oxalic deposits, however, it is of no utility. The dose is about two fluidounces, three or four times a day; in severe cases, this dose may be given every hour until relief is obtained, after which every three or four hours. In cases of gravel, a corresponding quantity of Wild Carrot Root and Seed may be advantageously added to the articles.—*J. K.*

INFUSUM GERANII COMPOSITUM. *Compound Infusion of Cranesbill.*

Preparation.—Take of Cranesbill, Witch Hazel, Black Cohosh, and Golden Seal, each, coarsely bruised, *half an ounce*; Boiling Water *two pints*. Mix the articles together, and digest with a gentle heat, in a close vessel, for two hours; remove from the fire, and strain. If required, alum one drachm, may be added.

Properties and Uses.—This forms an efficacious astringent wash in aphthous and other diseases of the mouth and throat, when unaccompanied with inflammation; and is also useful as an injection in leucorrhœa, prolapsus ani, and prolapsus uteri.—*J. K.*

INFUSUM HYDRASTIS COMPOSITUM. *Compound Infusion of Golden Seal.*

Preparation.—Take of Golden Seal, Blue Cohosh, Witch Hazel, of each in powder, *half an ounce*; Boiling Water *one pint*; pulverized Alum *one drachm*; Honey *a sufficient quantity*. Add the plants to the Boiling Water, and digest with a gentle heat, in a close vessel, for half an hour,

remove from the fire, strain, add the Alum, and sufficient Honey to thoroughly sweeten the infusion.

Properties and Uses.—This infusion is very valuable as a wash or gargle in various forms of sore mouth, and ulcerated sore throat.—*J. K.*

INFUSUM SALVIE COMPOSITUM. *Compound Infusion of Sage.*

Preparation.—Take of Sage Leaves, Hyssop Leaves, of each, *one ounce*; Boiling Water *two pints*; pulverized Borax *one drachm.* Place the Herbs in the Boiling Water, allow them to digest for half an hour, then strain and add the Borax.

Properties and Uses.—This infusion is employed as a wash and gargle in aphthæ, sore throat, and quinsy, when accompanied with inflammation.

LINIMENTA.

Liniments.

These preparations are designed for external application, and should always be of a consistence which will enable them to be applied to the skin by gentle friction with the naked hand, or flannel. They are usually composed of Oily, Spirituous, Gummy, or Saponaceous substances, are thinner than ointments, more consistent than water, and at the temperature of the body are always liquid. The benefit derived from them, depends either upon their counter-irritating influences, or from absorption of their active constituents. Liniments are usually prescribed extemporaneously by physicians, each having a preference; yet it is absolutely necessary that there be some established rule in relation to them, and that the officinal preparation be generally known.

LINIMENTUM ACONITI. *Linimentum Aconiti Radicis. Aconite Liniment.*

Preparation.—Take of Aconite Root, in powder, *four ounces*; Glycerin *two fluidrachms*; Alcohol *a sufficient quantity.* Macerate the Aconite with *half a pint* of Alcohol for twenty-four hours, then pack it in a small displacer, and add Alcohol gradually until a pint of tincture has passed. Distil off twelve fluidounces, and evaporate the residue until it measures twelve fluidrachms. To this add Alcohol *two fluidrachms*, and the Glycerin, and mix them.

History.—This preparation is offered by W. Procter, Jr., as a substitute for aconitia as an external anæsthetic application. It is twice the strength of the root, and is exceedingly active. The Glycerin is added for the purpose of retarding evaporation after application of the liniment to the skin, and which may be further secured by using oiled silk.

Properties and Uses.—This liniment may be used in all cases in which aconitia would prove useful, as in gout, neuralgia, and rheumatism. It is to be used as follows: Cut a piece of lint or muslin of the size and form of the part to be treated, lay it on a plate or waiter, and by means

of a camel's hair brush, saturate it with the *Liniment*. Thus prepared it should be applied to the surface, a piece of oiled silk laid over and kept in place by an adhesive edge, or by a bandage. Care should be taken not to apply it to an abraded surface, and in its use the patient should be informed of its character, and avoid bringing it in contact with the eyes, nostrils, or lips.

LINIMENTUM ÆRUGINIS. *Mel Ægypticum. Verdigris Liniment.*

Preparation.—Take of Verdigris (Subacetate of Copper), in powder, *one ounce*; Vinegar *seven fluidounces*; Honey *fourteen ounces*. Dissolve the Verdigris in the Vinegar, and strain through linen; then gradually add the Honey, and boil down to the proper consistence.

Properties and Uses.—This is an external stimulant and escharotic, and is sometimes employed to repress or destroy fungous growths. It may be used undiluted or rubbed up with some unirritable ointment, in which latter state it forms an excellent stimulant to indolent ulcers. When diluted with water it has been applied to venereal ulcers in the mouth and throat, by means of a camel's hair brush, or used as a gargle.—*U. S.*

LINIMENTUM AMMONIÆ. *Liniment of Ammonia. Common or Volatile Liniment.*

Preparation.—Take of Solution of Ammonia *a fluidounce*; Olive Oil *two fluidounces*. Mix them.—*U. S.*

History.—In this liniment a soap is formed by the union of the oil and ammonia, which is but imperfectly dissolved, and a white, opake emulsion is obtained.

Properties and Uses.—This preparation is used as a rubefacient in rheumatic pains, inflammatory diseases of the throat, and catarrhal and other pectoral affections of children. The skin is to be gently rubbed with it, or it may be applied over the part on a piece of flannel moistened with it. If it becomes too active, it must be diluted with a sufficient quantity of oil.

LINIMENTUM AMMONIÆ COMPOSITUM. *Compound Liniment of Ammonia.*

Preparation.—Take of Stronger Solution of Ammonia *five fluidounces*; Tincture of Camphor *two fluidounces*; Spirit of Rosemary *one fluidounce*. Mix them well together. This liniment may also be made weaker for some purposes with *three fluidounces* of Tincture of Camphor, and *two* of Spirit of Rosemary.

History.—This liniment of the two strengths given, is a mere dilution of the stronger Solution of Ammonia, in two different degrees; the ammonia itself being too powerful for use. It closely resembles Granville's Counter-irritant Lotion. The camphor and rosemary serve but little other purpose here than that of diluting agents.

Properties and Uses.—These liniments act promptly and powerfully, and may be employed as rubefacients, vesicatories, or escharotics. For mere rubefaction the weaker preparation may be used, and even for vesication; but where immediate action is desired, the stronger one must be employed. In applying them, a piece of linen folded two or three times, is saturated with the fluid, applied over the part, and prevented from evaporating by dry cloths placed over it; the degree of action depends entirely on the length of time in which it is thus kept in contact with the skin. A very good plan is to select a box the size of the part to be acted upon, introduce patent lint, saturated with the fluid, into the box, and hold it firmly upon the part. In from one to five or eight minutes, rubefaction is produced; in from three to eight or ten, vesication; and somewhat longer for its escharotic effect. It is usually employed in neuralgic, gouty, spasmodic, rheumatic, and other affections, where speedy and powerful counter-irritation is demanded.

LINIMENTUM CAJUPUTI COMPOSITUM. *Compound Cajeput Liniment.*

Preparation.—Take of Oils of Sassafras, Cajeput, and Hemlock, each, *one ounce*; Soap *a sufficient quantity*. Mix them together and form a liniment.

Properties and Uses.—This forms a valuable stimulating and discutient application; it is principally used in indolent scrofulous tumors.—*J. K.*

LINIMENTUM CALCIS. *Liniment of Lime.*

Preparation.—Take of Lime-Water, Linseed Oil, each, *a fluidounce*. Mix them together and form a liniment.

History.—The Oil and Lime unite and form a Soap; and the oil being in excess separates upon standing. This is also called *Carron Oil*.

Properties and Uses.—This is a very useful application to recent burns and scalds; it is best applied on carded cotton. The following is also reputed beneficial in burns; take of Lime-Water *two fluidounces*; Oil of Turpentine, Olive Oil, each, *one fluidounce*. Mix. If to be used immediately after the accident, add Oil of Pennyroyal *one fluidounce*.

LINIMENTUM CAMPHORÆ. *Camphor Liniment.*

Preparation.—Take of Camphor *an ounce and a half*; Chloroform *two fluidrachms*; Olive Oil *two fluidounces*. Dissolve the Camphor in the Oil and Chloroform mixed together.

Properties and Uses.—This forms an anodyne application in sprains, bruises, rheumatic and neuralgic pains, as well as other local pains.

LINIMENTUM CAOUTCHOUC. *Caoutchouc Liniment.*

Preparation.—Take of Caoutchouc, in fine pieces, *a convenient quantity*; Oil of Origanum *a sufficient quantity*. Dissolve the Caoutchouc in the Oil.

History.—In this manner Caoutchouc may be dissolved in any of the stimulating essential oils. If the mixture be spread on paper, allowed

to dry, and again spread, a valuable stimulating plaster may be had. A stimulating liniment was at one time much used by a certain class of practitioners, prepared as follows: Take of Caoutchouc, in small pieces, *four ounces*; Linseed Oil *one pint*. Mix together, and dissolve the Caoutchouc by means of a charcoal fire; then add Tallow *three-fourths of a pound*; Antispasmodic Tincture, Oil of Spearmint, of each, *two fluid-ounces*; Oils of Peppermint and Pennyroyal, of each, *one fluidounce*. This may be applied with much friction, or spread on a bladder.

Properties and Uses.—These preparations may be used whenever stimulating applications are desired. We give them here, because they are sometimes employed by physicians of various schools. Probably, the addition of the Caoutchouc increases the non-conducting properties of these liniments.

LINIMENTUM CAPSICI COMPOSITUM. *Compound Capsicum Liniment.*

Preparation.—Take of Tincture of Capsicum *two fluidounces*; Tincture of Opium, and Aqua Ammoniaë, of each, *three fluidrachms*; Oil of Oreganum, *two fluidrachms*; Oil of Cinnamon, and Tincture of Camphor, of each, *one fluidrachm*. Mix.

Properties and Uses.—This is a very efficacious application in rheumatic, pleuritic, neuralgic, and other pains.

LINIMENTUM CROTONIS. *Croton Oil Liniment.*

Preparation.—Take of Croton Oil *one fluidounce*; Oil of Turpentine *seven fluidounces*. Mix together with agitation.

Properties and Uses.—This acts as a prompt rubefacient; and when used for some time, produces pustulation. From ten to thirty minims may be placed upon a limited surface, and rubbed in; and when pustulation is required, this should be repeated two or more times every day.

LINIMENTUM NIGRUM. *Black Liniment.*

Preparation.—Take of Olive Oil *one ounce and a half*; Sulphuric Acid *one fluidrachm*; mix well together, and then add, Oil of Turpentine *half an ounce*.

Properties and Uses.—An active counter-irritant, but does not vesicate. To be rubbed on the part with a piece of lint, twice a day, until the skin becomes tender and inflamed. It may be used in indolent swellings of joints, rheumatic pains, and wherever active counter-irritation is indicated.—*Brodie.*

LINIMENTUM OLEI. *Liniment of Oils.*

Preparation.—Take of Oils of Cedar, Cajeput, Cloves, and Sassafras, of each, *one fluidounce*. Mix.

Properties and Uses.—This forms an efficacious application to rheumatic and other painful affections; it should be rubbed on the affected part, three or four times daily.

LINIMENTUM OLEI COMPOSITUM. *Compound Liniment of Oils. Concentrated Liniment.*

Preparation.—Take of Oils of Origanum, Hemlock, and Cajeput, and Camphor, each, *four ounces*, by weight; Capsicum *two ounces*. Mix the Oils and dissolve the Camphor in the mixture; then add the Capsicum, and let it macerate for fourteen days, frequently agitating. Then filter.

Properties and Uses.—This is a powerful counter-irritant, and may be employed with advantage in indolent tumors, indurated mammæ, rheumatic and other pains, and to the spine, in epilepsy, nervous debility, etc.—*J. K.*

LINIMENTUM OPII. *Liniment of Opium. Anodyne Liniment.*

Preparation.—Take of Castile Soap *six ounces*; Opium *an ounce and a half*; Camphor *three ounces*; Oil of Rosemary *six fluidrachms*; Rectified Spirit *two pints*. Macerate the Soap and Opium in the Spirit for three days; filter, add the Oil and Camphor, and agitate briskly.

Properties and Uses.—This is an anodyne and mild rubefacient application in sprains, bruises, rheumatic, and gouty pains.

LINIMENTUM SAPONIS CAMPHORATUM. *Camphorated Soap Liniment. Opodeldoc.*

Preparation.—Take of Common White Soap *two ounces*; Camphor *one ounce*; Oil of Rosemary *three drachms*; Oil of Origanum *two drachms*; Aqua Ammonia F F F, *one ounce*; Alcohol *one pint and a half*. Digest the Soap with the Alcohol, by means of a sand-bath, till it is dissolved; then add the Camphor, Oils, and Ammonia, and when they are dissolved, pour the liquor into broad-mouthed bottles. This liniment has, when cold, the consistence of a soft ointment.

History.—This Liniment is prepared with White Soap, which is made with animal fat, while Castile Soap is made with Olive Oil, in consequence of which, when the Alcoholic solution cools, the liniment assumes an appearance of solidity. Under the name of *Opodeldoc* it is placed into wide-mouthed glass vials, holding about four ounces each, and is extensively employed throughout the country. It forms a soft, translucent, uniform, yellowish-white mass, which melts at the temperature of the body. The formula above given, I consider to be much preferable to the one ordinarily followed in manufacturing the article.

Properties and Uses.—Camphorated Soap Liniment is an excellent anodyne embrocation in sprains, bruises, rheumatic and other pains.

LINIMENTUM STILLINGIÆ COMPOSITUM. *Compound Liniment of Stillingia.*

Preparation.—Take of Oil of Stillingia *one fluidounce*; Oil of Cajeput *half a fluidounce*; Oil of Lobelia *two fluidrachms*; Alcohol *two fluidounces*. Mix together.—*R. S. N.*

Properties and Uses.—This forms a peculiar kind of Liniment, possessing stimulant and relaxant properties. It is used in chronic asthma, croup, epilepsy, chorea, etc. In asthma and croup, the throat, chest and neck is to be bathed with it, three or four times a day. In chorea, epilepsy, and spasmodic diseases, the whole vertebral column is to be bathed with it. In rheumatism, sprains, and painful affections, the diseased parts are to be bathed with it. In asthma its action is very prompt and effectual, relieving and ultimately curing the most obstinate cases. In the majority of instances, when applied to the chest, neck, etc., the patient experiences a peculiar taste in the mouth, somewhat resembling that of the Lobelia and Stillingia combined. It is often used of less strength, as—Take of Oil of Stillingia *half a fluidounce*; Oil of Cajeput *half a fluidounce*; Oil of Lobelia *one fluidrachm*; Alcohol *three fluidounces*. Mix. It is an agent peculiar to Eclectic practice, and is very active and efficacious.

LINIMENTUM SUCCINI COMPOSITUM. *Compound Liniment of Oil of Amber.*

Preparation.—Take of Oil of Stillingia, Rectified Oil of Amber, each, *one fluidounce*; Oil of Lobelia *three fluidrachms*; Olive Oil *two fluidounces*. Mix together.

Properties and Uses.—I have found this preparation very efficient in chronic asthma, croup, pertussis, chorea, epilepsy, rheumatism, sciatica, and various other spasmodic and painful affections; in many instances being much superior to the Compound Liniment of Stillingia. Its manner of application is the same as recommended for the preceding Liniment. In very severe cases, it may be applied every hour, or half hour, and continued until vomiting ensues. It acts as a stimulant, relaxant, and antispasmodic. In many of the above diseases it will effect a cure without the exhibition of any internal medicine; and is especially useful among children to whom it is difficult to administer remedies by mouth, or in cases where the stomach rejects all medicines. Care must be taken not to use too much of this liniment at any one application.—*J. K.*

LINIMENTUM TEREBINTHINÆ COMPOSITUM. *Compound Liniment of Turpentine. White Liniment.*

Preparation.—Take of Rose Water *two and a half fluidounces*; Yelk of Egg *one*; Oil of Turpentine *three fluidounces*; Oil of Lemon *half a fluidrachm*; Pyroligneous Acid, (or in its absence, Acetic Acid) *one fluidounce*. To the Yelk slowly add the Rose Water, and rub together in a mortar; then add the Turpentine and Oil of Lemon. Pour the mixture into a pint bottle, and agitate to mix thoroughly; then add the Acid, and agitate quickly and briskly. It must be kept well corked.

Properties and Uses.—Used in asthma and inflammation of the lungs, rubbing it on the throat and chest with a sponge or cloth, from the epiglottic region to the epigastric; also useful wherever a counter-irritant is required.

LIQUORES.

Liquors, or Solutions.

LIQUOR FERRI IODIDI. *Solution of Iodide of Iron.*

Preparation.—Take of Iodine *two ounces*; Iron Filings *an ounce*; Powdered Sugar *twelve ounces*; Distilled Water *a sufficient quantity*. Mix the Iodine with five fluidounces of Distilled Water, in a porcelain or glass vessel, and gradually add the Iron Filings, stirring constantly. Heat the mixture gently until all the Iodine is dissolved, or until the liquid acquires a light-greenish tint. Then filter the solution into a glass bottle, containing the Sugar, and, after it has passed, pour Distilled Water gradually upon the filter, until the filtered liquor, including the Sugar, measures twenty fluidounces. Lastly, shake the bottle until the Sugar is dissolved, and keep it closely stopped.—*U. S.*

History.—By this process, the Solution of Iodide of Iron, is preserved from change by the addition of sugar. The iodine used should be dry, otherwise, less of the iodide will be formed, and the solution will be weaker. An excess of iron is employed, in order to prevent the absorption of oxygen while filtering, from producing any change, previous to the contact of the liquor with the sugar. When all the iodine is converted into iodide of iron, the solution will contain seven grains and a half of the dry iodide to every fluidrachm.

In forming the solution, the iron is rapidly oxidated at the expense of the water, the hydrogen of which unites with the iodine to form hydriodic acid. This unites with the iron forming a hydriodate of protoxide of iron, or, according to some chemists, a solution of protiodide of iron. This solution, however, as with all solutions in which iron is united with one equivalent of oxygen or chlorine, is exceedingly subject to decomposition by exposure to air and light, in which the oxide of iron passes into a sesquioxide, forming a solution of the hydriodate of sesquioxide of iron. To obviate this tendency to sesquioxidation, M. Frederking of Riga, and Professor Procter of Philadelphia, proposed the addition of saccharine matter, which they found to exert a protective action, and which fact has since been amply confirmed by many eminent chemists. Hence, the sugar is added to protect the solution of iodide of protoxide of iron from becoming converted into one of the sesquioxide.

Solution of Iodide of Iron is of a transparent, pale-green color, nearly, if not quite, destitute of any sediment. If the addition of starch changes it to a blue color, it is not perfect, but holds free iodine. Sulphuric acid added to it changes it to a brown color, with evolution of violent vapors on being heated.

Properties and Uses.—The medical properties are the same as mentioned under the head of *Iodide of Iron*; the dose is from twenty to forty drops, three times a day. It should be well diluted with water,

and the mouth should be carefully washed after each dose, in order to protect the teeth.

LIQUOR FERRI NITRATIS. *Solution of Nitrate of Iron. Solution of Pernitrate of Iron. Solution of Ternitrate of Sesquioxide of Iron.*

Preparation.—Take of Iron Wire, cut in pieces, *an ounce*; Nitric Acid, (sp. gr. 1.42) *three fluidounces*; Distilled Water *a sufficient quantity*. Mix the Acid with a pint of Distilled Water, add the Iron, and agitate occasionally until gas ceases to be disengaged; then filter the solution, and add to it sufficient Distilled Water to make it measure thirty fluidounces.—*U. S.*

History.—This preparation was introduced to the profession by Mr. William Kerr, of Scotland, in 1832. It is a very astringent liquid, of a transparent red color, and is apt to become turbid on standing, and to deposit sesquioxide. The tendency to this change was obviated by Mr. Kerr, by adding a small portion of muriatic acid to it. It is also proposed to add sugar to the solution for the same purpose. The salt, *Ternitrate of Sesquioxide of Iron*, is in crystals having the form of oblique rhombic prisms, colorless, or of a delicate lavender color, somewhat deliquescent, soluble in water, not fully soluble in nitric acid, and consists of three equivalents of nitric acid 162.76, one of sesquioxide of iron 80.03, and one of water $9=251.79$.

On account of the great liability to change in this preparation, various suggestions have been made for the purpose of procuring a permanent solution; among them is the following, offered, by W. Procter, Jr., of Philadelphia: Take of Iron Wire (card-teeth) cut in pieces, *an ounce*; Nitric Acid, (sp. gr. 1.42) *three fluidounces*; Water *thirteen fluidounces*; Sugar, in powder, *two pounds*. Put the Iron in a thin wide-mouthed bottle, which should be kept cool by standing in cold water, and pour upon it three fluidounces of Water. Then mix the Acid with ten fluidounces of Water, and add the mixture in portions of half a fluidounce to the Iron, agitating frequently until the Acid is saturated, using litmus paper to determine the saturation. When all the Acid has been combined, filter the solution into a bottle containing the Sugar and marked to contain thirty fluidounces. If the whole does not measure that bulk, pour Water on the filter until it does. When all the Sugar is dissolved, strain, if necessary, and introduce the syrup into suitable vials and seal them. This forms a syrup of the *Protonitrate of Iron*. Mr. Joseph Laidley, of Richmond, Va., has ascertained the formation of Oxalic Acid in the syrup of the *Sesquinitrate of Iron*, and considers it an unscientific and ineligible preparation; for, without an excess of Acid, it is a mixture of proto and pernitrate, and with that excess the Acid generates Oxalic Acid. He has found the solution of the protonitrate, as given by Prof. Procter, to keep perfectly well, even without the addition of the sugar, which, as the iron salt is already *per* oxidized, he considers

of no use for preventing what would not occur, viz : the further absorption of oxygen from the atmosphere.

Properties and Uses.—Solution of Nitrate of Iron is tonic and astringent, and has been used successfully in chronic mucous diarrhea not attended with ulceration of the intestines, and in weak, nervous constitutions, where there are no existing indications of inflammation. It has been effectually employed in menorrhagia; and in leucorrhea it may be administered both internally and by injection. In the colliquative diarrhea of tubercular phthisis it has afforded much benefit, as well as in chronic diarrhea and cholera infantum of anemic or scrofulous patients. The dose is seven or eight drops, sufficiently diluted, which may be repeated three or four times a day, and gradually increased to twenty or twenty-five drops. When used as an injection into the vagina, it should be diluted sufficiently to occasion only a slight heat and smarting.

W. W. D. Livermore offers the following formula for the preparation of a permanent solution of this ferruginous salt; it furnishes nearly the same result as obtained by Procter's method given above: Take of Sulphate of Iron *eight ounces*; Carbonate of Soda *ten ounces*; White Sugar *twenty ounces*; Nitric Acid, (sp. gr. 1.42) *five fluidounces and five fluidrachms*; Boiling Water, Simple Syrup, of each, *a sufficient quantity*. Dissolve the Sulphate of Iron and Carbonate of Soda, each, in two pints of the Water, filter, and add to each solution two ounces of Simple Syrup. Mix the solutions, and allow the precipitate to subside. Pour off the supernatant liquid, and wash the precipitated carbonate carefully with Sweetened Water, until the washings have no longer a saline taste. Collect the Precipitate upon a fine muslin strainer, and with gentle pressure express as much of the Water as possible. Transfer to a porcelain capsule, and add gradually the Nitric Acid, previously diluted with an equal measure of Water. Mix the Sugar with the solution, and dissolve over a water-bath, stirring from time to time with a glass rod. When done, the syrup should be made to measure thirty fluidounces, by the addition of a sufficient quantity of Water. Each fluidrachm of this syrup contains ten grains of Dry Nitrate of Iron, and the dose varies from twenty to forty drops.

LIQUOR IODINI COMPOSITUS. *Compound Solution of Iodine.*

Preparation.—Take of Iodine *six drachms*; Iodide of Potassium *an ounce and a half*; Distilled Water *a pint*. Dissolve the Iodine and the Iodide of Potassium in the Water.—*U. S.*

History.—Iodine is but sparingly soluble in water, but dissolves freely in a solution of Iodide of Potassium. In preparing this solution two parts of the iodide are generally added with one of iodine, forming a concentrated solution of iodine, which is the active medicinal agent in the solution. The solution loses its strength by exposure to the air, in consequence of the evaporation of the iodine; light also appears to exert

a deleterious influence upon it. It should, therefore, be kept in well stopped bottles, and in a dark place.

Properties and Uses.—Compound Solution of Iodine possesses all the virtues of iodine, and may be used advantageously in scrofulous, syphilitic, and all tuberculous diseases, or wherever iodine is indicated. The dose is six drops, in one or two tablespoonfuls of sweetened water, repeated three times a day, and gradually increased to twenty or thirty drops. Twelve drops is equal to about half a grain of iodine.

LIQUOR MAGNESIÆ CITRATIS. *Solution of Citrate of Magnesia.*

Preparation.—Take of Carbonate of Magnesia *five drachms*; Citric Acid *seven drachms and a half*; Syrup of Citric Acid *two fluidounces*; Water *a sufficient quantity*. Dissolve the Citric Acid in four fluidounces of Water, and add to the solution four drachms of the Carbonate of Magnesia, previously rubbed with three fluidounces of Water. When the reaction has ceased, filter the solution into a strong glass bottle, of the capacity of twelve fluidounces, into which the Syrup of Citric Acid has been previously introduced. Rub the remaining Carbonate of Magnesia with two fluidounces of Water, and pour the mixture into the bottle, which is then to be tightly corked, and secured with twine. Lastly, shake the mixture occasionally until it becomes transparent.—*U. S.*

History.—This preparation is an aqueous solution of Citrate of Magnesia; it contains Citric Acid in excess to the quantity of about fourteen and a half grains, with Carbonic Acid and syrup to render it more palatable. If the magnesia be good, it will be wholly dissolved by the citric acid; if it be impure there will be more or less of a sediment in the solution. When the first four-fifths of the magnesia are dissolved in the acid, an acid citrate of magnesia is formed; this being filtered upon the syrup of citric acid, has its acidity increased. The addition of the remainder of the magnesia gives rise to a further quantity of citrate with disengagement of carbonic acid, which is retained within the bottle by immediately corking it.

It forms a transparent solution, having an agreeable, lemonade-like taste, and consists of one equivalent of citric acid and three of magnesia. It is not permanent in its character, but forms a deposit on keeping, and is intended as an extemporaneous solution, to be prepared only as required.

Properties and Uses.—Solution of Citrate of Magnesia, is a pleasant, cooling purgative, acting mildly upon the bowels. The dose as a cathartic is about twelve fluidounces; as a laxative, half that quantity.

LIQUOR POTASSÆ. *Solution of Potassa.*

Preparation.—Take of Carbonate of Potassa *a pound*; Lime *half a pound*; Boiling Distilled Water *a gallon*. Dissolve the Carbonate of Potassa in half a gallon of the Water. Pour a little of the Water on the Lime, and when it is slaked add the remainder. Mix the hot liquors,

and boil for ten minutes, stirring constantly ; then set the mixture aside, in a covered vessel, until it becomes clear. Lastly, pour off the supernatant liquor and keep it in well stopped bottles of green glass. The specific gravity of this solution is 1.056.—*U. S.*

History.—In this process, the potassa is obtained in a caustic state by means of the hydrate of lime, the lime of which unites with the carbonic acid of the carbonate of potassa, and forms a precipitate of carbonate of lime ; while its water combines with the potassa forming a solution of potassa. The solution should not be strained, on account of the tendency to absorb carbonic acid by prolonged exposure to the air, and which, of course, would deteriorate its strength and value. The reason for directing it to be kept in green glass bottles, is, that the solution exerts an action on white flint-glass.

Solution of Potassa is an alkaline, inodorous, transparent, colorless liquid, having an acrid, caustic taste. It dissolves animal and vegetable substances, as gum, resins, and extractive matter, and forms soaps with fats and oils. When rubbed between the fingers it produces a soapy feeling, owing to the cuticle being partially acted upon by it. When prepared for medical purposes it is commonly more or less impure, containing either some free lime, undecomposed carbonate, or other foreign matters ; for chemical purposes, it requires to be pure. When exposed to the air it absorbs carbonic acid, for which it has a strong affinity, and should therefore always be preserved in thoroughly-stopped bottles. It is *incompatible* with all salts of ammonia, calomel, corrosive sublimate, acids, acidulous salts, and acidulous solutions of metallic and earthy preparations.

Properties and Uses.—Solution of Potassa is employed in medicine as an antacid, antilithic, and diuretic. Although it can exert no solvent influence upon calculi once formed in the bladder, yet it may overcome the tendency to an excess of uric acid or the insoluble urates, which so often give rise to gravel and stone. For this purpose, however, it is inferior to solutions of the carbonated alkalies, which may be administered for a longer time without occasioning any injurious influences. The long-continued use of solution of potassa debilitates the stomach, and otherwise impairs the system. As an antacid, the solutions of the carbonates are preferable. In scalding of the urethra accompanying gonorrhea, combined with ten or twelve drops of laudanum, liquor potassa will be found to afford prompt relief. The dose is from ten to thirty minims, repeated two or three times a day ; and it may be administered in sweetened water, or in some mucilaginous liquid. When taken in quantities to injure the stomach, or in an undiluted state, oils, vinegar, and lemon-juice, which neutralize the alkali, are the proper antidotes.

Off. Prep.—Potassa cum Calce.

LIQUOR POTASSÆ CITRATIS. *Solution of Citrate of Potassa. Neutral Mixture.*

Preparation.—Take of Citric Acid *half an ounce*; Oil of Lemons *two minims*; Water *half a pint*; Bicarbonate of Potassa *a sufficient quantity*. Rub the Citric Acid with the Oil of Lemons, and afterward with the Water till it is dissolved; then add the Bicarbonate of Potassa gradually till the Acid is perfectly saturated; lastly, filter: or, Take of Fresh Lemon-juice *half a pint*; Bicarbonate of Potassa *a sufficient quantity*. Add the Bicarbonate gradually to the Lemon-juice till it is perfectly saturated; then filter.—*U. S.*

History.—In these formulæ the citric acid combines with the potassa of the bicarbonate, and carbonic acid is set free, forming a solution of Citrate of Potassa, containing free carbonic acid. The citric acid and oil of lemon, in the first process, are intended to supply the absence of fresh lemon-juice. When the solution is made with citric acid it is colorless, and when with lemon-juice, it is greenish. Filtering is directed for the purpose of removing any foreign or undissolved substances. The point of saturation may be known by the liquid effecting no change in blue and red litmus paper.

Properties and Uses.—This solution is a refrigerant diaphoretic, and may be used in all fevers attended with a dry, hot skin; it is also useful in allaying irritability of the stomach. It forms a very grateful draught to the patient. Spirits of Nitre, Solution of Sulphate of Morphia, Tincture of Aconitum or Digitalis, are frequently added to assist in fulfilling required indications. The dose is half a fluidounce, or an ordinary tablespoonful, diluted with water, and repeated every one, two, or three hours according to the urgency of the symptoms. It may be sweetened with sugar if desired.

LIQUOR SODÆ CHLORINATÆ. *Solution of Chlorinated Soda. Labarraque's Disinfecting Liquid.*

Preparation.—Take of Chlorinated Lime (chloride of lime) *a pound*; Carbonate of Soda *two pounds*; Water *a gallon and a half*. Dissolve the Carbonate of Soda in three pints of the Water, with the aid of heat. To the remainder of the Water add, by small portions at a time, the Chlorinated Lime previously well triturated; stirring the mixture after each addition. Set the mixture by for several hours that the dregs may subside; then decant the clear liquid, and mix it with the solution of Carbonate of Soda. Lastly, decant the clear liquor from the precipitated Carbonate of Lime, pass it through a linen cloth, and keep it in bottles secluded from the light.—*U. S.*

History.—This preparation was originally introduced by a Parisian apothecary, named Labarraque, as a disinfecting agent. By the above process, a solution of carbonate of soda is decomposed by one of chlorinated lime; the carbonic acid of the soda unites with the lime and

precipitates as carbonate of lime, while the chlorine of the chlorinated lime combines with the soda, forming a chlorinated soda in solution; the solution is rendered more permanent by the excess of carbonate of soda, which is present, when prepared as above. Further analyses are required to determine the exact constitution of this solution.

Properties and Uses.—Solution of Chlorinated Soda is a powerful disinfectant, antiseptic, stimulant, and resolvent. Its disinfectant property is owing to its absorption of carbonic acid, and gradual evolution of chlorine, when exposed to the air; and for which purpose it may be used in the rooms of patients with infectious diseases, by sprinkling some of it on the bed, floor, or other parts of the room.

As an internal agent it is used in putrid or malignant diseases, as scarlatina, typhus, small-pox, etc., especially when attended with great debility, offensive evacuations, and a dry, brown-furred tongue; in which it promotes the secretions and evacuations, increasing the urine, and producing gentle diaphoresis, with a beneficial change in the condition of the tongue. It has likewise been efficaciously employed in dysentery, and diarrhea, attended with very offensive evacuations, in dyspepsia accompanied with eructations of a fetid nature, also in glandular enlargements, and in mucous discharges of a chronic character. In asphyxia caused by sulphureted hydrogen, it is an efficient antidote. It has also been highly recommended in various other diseases, as scrofula, chronic diseases of the skin, secondary syphilis, amenorrhea, dysmenorrhea, and bilious affections. From thirty drops to half a fluidrachm, in a cupful of water, is the dose, and which may be repeated every two or three hours. As an external remedy, it forms a valuable application to cancerous, scrofulous, syphilitic, and gangrenous ulcers, and other affections attended with fetor, as carbuncle, ozæna, ulceration of the gums, putrid sore-mouth and throat, mercurial sore-mouth, fetid discharges from the vagina, uterus, and bladder; and has been successfully applied to burns, and cutaneous diseases, as tinea capitis, scabies, herpes, psoriasis, etc. Applied frequently to sore nipples, it is a superior remedy. When used externally, it may be diluted with from five to thirty parts of water, according to circumstances.

LOTIONES.

Lotions, or Washes.

These comprise all compounds used as external washes and collyria, in which vegetable or mineral substances are dissolved in water or spirits, but which do not strictly class with infusions, liniments, mixtures, or tinctures.

LOTIO ALKALINA. *Alkaline Wash.*

Preparation.—Take of Carbonate of Soda (*Sal Soda*) two drachms; Warm Rain-Water one quart. Dissolve: or,

Make a weak Ley by adding Hard Wood Ashes to Hot Water.

Properties and Uses.—This wash is extensively and efficaciously employed by Eclectics, as an application to the surface of the body and limbs in all febrile and inflammatory diseases, and in chronic affections. In the former cases it is applied several times a day, especially when the acute symptoms run high; in the latter affections it is commonly used once or twice a week. The surface should always be well rubbed and dried immediately after each application. Frequently, when external stimulus is also required, the above proportion of water is lessened one-fourth or one-half, and the balance of the quantity made up by the addition of whisky or other spirit.

LOTIO ÆTHERIS COMPOSITA. *Compound Ethereal Lotion. Evaporating Lotion.*

Preparation.—Take of Sulphuric Ether, Rectified Alcohol, Solution of Acetate of Ammonia, each, *one ounce and a half*; Rose-Water *three ounces and a half*. Mix together.

Properties and Uses.—This lotion may be used to produce a refrigerant or stimulant influence according to its mode of employment. Applied to a surface and allowed to evaporate by free exposure, it acts as a *refrigerant*; but if the evaporation is prevented by covering the part to which it is applied with the hand or a cloth, it acts as a *stimulant*. The Solution of Acetate of Ammonia, largely diluted, (without the addition of ether or alcohol), is a superior cooling lotion in all cases of fever where there is a hot and dry state of the surface, often of itself inducing diaphoresis.

LOTIO BORACIS. *Borax Lotion. Cooling Wash.*

Preparation.—Take of Borax, in powder, *one ounce*; Rain Water *one quart*. Dissolve. In this preparation, soft River Water may be substituted for Rain Water, when this latter cannot be obtained.

Properties and Uses.—This forms a cooling application, and may be used in inflammation of the eyes, sore and inflamed nipples, aphthous ulcerations of the mouth and fauces, and other irritated or inflamed mucous surfaces.

LOTIO BORACIS cum MORPHIÆ. *Borax Lotion with Morphia.*

Preparation.—Take of Borax, in powder, *half an ounce*; Sulphate of Morphia *six grains*; Decoction of Golden Seal *eight fluidounces*. Dissolve the Borax and Morphia in the Decoction.

Properties and Uses.—This forms a cooling and mild anodyne wash, and may be used in inflammation of the eyes, sore and inflamed nipples, pruritus vulva, aphthous ulcerations of the mouth and fauces, and other irritated or inflamed mucous surfaces.

LOTIO GLYCERINI. *Glycerin Lotion.*

Preparation.—Take of Glycerin *half an ounce*; Distilled Water *half a pint*. Mix.

Properties and Uses.—This lotion has been recommended in eczema, lichen, and other cutaneous diseases; also as an application to the meatus externus in cases of deafness owing to a want of secretion of cerumen.

LOTIO HYDRASTIS COMPOSITA. *Compound Lotion of Golden Seal.*

Preparation.—Take of Strong Decoctions of Green Tea, and Golden Seal, each *one pint*; Sulphate of Zinc, Gunpowder, dried Sulphate of Iron, of each *two drachms*. Mix the decoctions, then add the remainder of the articles, and agitate briskly. After solution and decomposition have ceased, and the precipitate has subsided, pour off the supernatant liquid.

Properties and Uses.—This lotion is principally employed as a collyrium in chronic ophthalmic diseases, but it may be advantageously employed in all chronic affections of mucous surfaces, as an external application. The affected parts are to be bathed with it several times a day.

LOTIO HYDRASTIS ET ACONITI. *Lotion of Golden Seal and Aconite.*

Preparation.—Take of Golden Seal, in powder, *four drachms*; Boiling Water *four fluidounces*; Tincture of Aconite *one fluidrachm*. Add the Golden Seal to the Water, and digest for three hours by a gentle heat; then filter and evaporate to two fluid ounces, to which add the Tincture of Aconite.

Properties and Uses.—This forms a superior application to the eye in many cases of disease of that organ; it may be applied by means of a camel's hair pencil, or by dropping a minim or two on the eyeball. I have likewise found immense benefit in these cases, by substituting for the Tincture of Aconite, a *fluidrachm* or *two* of the Saturated Tincture of Black Cohosh. Some physicians employ Hydrastin in preparing the above formula, but as this is insoluble in water, it can effect but little influence. This preparation will also be found of service in chronic mucous difficulties, as vaginal leucorrhea, etc., used as a wash or injection.—*J. K.*

LOTIO JUGLANDIS. *Walnut Lotion.*

Preparation.—Take of Extract of green Walnut Shells *six grains*; Distilled Water *fifty grains*. Mix and dissolve.

Properties and Uses.—This is recommended as an efficacious agent in enlargement of the tonsils, and is stated to be very prompt in its effects. It is applied to the parts by means of a camel's hair pencil.

LOTIO LOBELIÆ COMPOSITA. *Compound Lobelia Lotion. Herpetic Wash.*

Preparation.—Take of Bayberry Bark, Lobelia Leaves and Seed, Yellow Dock Root, each, in powder, *two drachms*; Vinegar *one pint*. Mix all together, and allow them to macerate for seven days, and filter; or make the lotion by displacement.

Properties and Uses.—This preparation forms an excellent local application to several species of cutaneous disease, also to erysipelas and erysipelatous inflammations. It is frequently prepared with Spirits instead of Vinegar, especially where more active stimulation is desired. In erysipelas, half a pint of a saturated solution of Muriate of Ammonia, may be added to the above quantity, with advantage.

LÓTIO MYRRHÆ COMPOSITA. *Compound Myrrh Lotion. Stimulating Eyewater.*

Preparation.—Take of Myrrh, in powder, *one ounce*; Sulphate of Zinc, Acetate of Lead, of each *half an ounce*; Boiling Water *two quarts*. Add the Myrrh and the Salts to the Water, and allow them to macerate for seven days, and then filter. In the preparation of this lotion, a decomposition necessarily ensues.

Properties and Uses.—Compound Myrrh Lotion is chiefly employed in cases of chronic ophthalmia; it will, however, be found useful in all chronic mucous diseases. It is usually applied three or four times a day, and must not be used during the presence of inflammation. When too severe it may be diluted with water.

LÓTIO REFRIGERANS. *Cooling Lotion. Saline Wash.*

Preparation.—Take of fine Salt *an ounce*; Spirits, Vinegar, and Rain Water, of each, *half a pint*. Mix the fluids together, and then add the Salt. In the absence of Rain Water, clear river water may be substituted.

Properties and Uses.—This Lotion is extensively employed as a cooling application, in cases of pain or determination to the head, during fevers, inflammation of the brain, dropsy, etc. It is used cold or tepid, according to the benefit received from its application at these temperatures.

LÓTIO SASSAFRAS. *Sassafras Lotion.*

Preparation.—Take of Pith of Sassafras *one ounce*; Rose Water *a sufficient quantity*. Mix, let them stand for an hour or two and filter.

Properties and Uses.—This is an extemporaneous preparation, and is principally used in acute ophthalmia. A similar preparation of Marsh Mallow Root, Elm Bark, or Buckhorn Brake, will be found equally available.

LÓTIO SODII COMPOSITA. *Compound Soda Lotion.*

Preparation.—Take of Rock Salt *three ounces*; Sulphate of Zinc *one ounce*; Red Oxide of Iron (Sesquicarbonate) *eight grains*; Rain Water, or clear River Water *one pint*. Add the articles together, and form a solution; and when the precipitate formed, has subsided, pour off the supernatant liquid.

Properties and Uses.—Used as a stimulating collyrium in chronic ophthalmic diseases.

LOTIO ZINCI COMPOSITA. *Compound Lotion of Zinc.*

Preparation.—Take of Sulphate of Zinc, Rock Alum, each, *one scruple*; Distilled Water *two pints*. Mix, and when dissolved filter.

Properties and Uses.—This lotion is used as a stimulating application to the eye in cases of films, specks, opacities, etc.; to abnormal growths on mucous surfaces; to indolent ulcers with fungous growths; and to gangrene.

MISTURÆ.

Mixtures.

By mixtures is meant all those preparations, containing Oleaginous, Mucilaginous, Albuminous, or Saccharine Substances, which are used internally, and cannot properly be classed with infusions, decoctions, syrups, tinctures, etc.; also compounds in which Insoluble Substances, whether liquid or solid, are suspended in aqueous fluids by the intervention of some viscid matter.

MISTURA CAMPHORÆ COMPOSITA. *Compound Mixture of Camphor.*

Preparation.—Take of Camphor Water, Peppermint Water, and Spearmint Water, each, *one fluidounce*; Camphorated Tincture of Opium *two fluidrachms*. Mix together.

Properties and Uses.—This is a very efficacious agent in allaying nausea and vomiting. It was extensively and successfully employed by the Eclectics in the nausea and vomiting attending Asiatic cholera. It possesses the virtues of the several articles entering into its composition, without the stimulating influence of the alcohol, which enters into their tinctures, upon already partially inflamed mucous surfaces. The dose is from a teaspoonful to a tablespoonful every five minutes, if the patient be vomiting; and every ten minutes if he be only nauseated.

MISTURA CAJUPUTI COMPOSITA. *Compound Cajeput Mixture. Hunn's Drops.*

Preparation.—Take of Oils of Cajeput, Cloves, Peppermint, and Anise, each, *one fluidounce*; Rectified Alcohol *four ounces*. Dissolve the Oils in the Alcohol.

Properties and Uses.—This is a very valuable stimulant and antispasmodic preparation, and has been successfully used in colic, cramp of the stomach or elsewhere, flatulence, pains in the stomach or bowels, painful diarrhea, cholera-morbus, Asiatic cholera, and in all cases where stimulant and antispasmodic action is desired. During the cholera of 1849-50-51, it was extensively used by the Eclectics for the purpose of overcoming violent spasmodic action, in the doses of one or two fluidrachms, every ten or fifteen minutes; one or two doses, generally succeeded in relieving the pains and spasms when all other means had failed. The

ordinary dose is from ten drops to half a fluidrachm. It should be given in simple syrup, mucilage of slippery elm, or in hot brandy and water, sweetened. Care should be taken not to introduce too much of this preparation into the stomach at any one time, as a large proportion of it would produce inflammation of the stomach. It is a very valuable agent, when properly used, and should always be kept by every physician and druggist.

MISTURA CHENOPODII COMPOSITA. *Compound Wormseed Mixture. Worm Mixture.*

Preparation.—Take of Castor Oil *one fluidounce*; Wormseed Oil, Anise Oil, and Tincture of Myrrh, of each, *one fluidrachm*. Mix.

Properties and Uses.—This is an excellent vermifuge, and may be used in doses of one teaspoonful for an adult, to be repeated three or four times a day, and after having been taken for three successive days, to be followed by a cathartic. This somewhat resembles “Fahnestock’s Vermifuge,” which is said to be composed of, Castor Oil *one fluidounce*; Oil of Wormseed *one fluidounce*; Oil of Anise *half a fluidounce*; Tincture of Myrrh *half a fluidrachm*; Oil of Turpentine *ten minims*; Croton Oil *one minim*. Mix. The dose is a teaspoonful for an adult, every two hours, to be continued for ten or twelve hours.

MISTURA COPAIBÆ COMPOSITA. *Compound Copaiba Mixture. Diuretic Drops.*

Preparation.—Take of Spirit of Nitric Ether and Oil of Almonds, each *two fluidounces*; Copaiba, and Oil of Turpentine, of each, *one fluidounce*; Camphor, in powder, *one scruple*. Mix together the liquids, then add the Camphor, and agitate briskly.

Properties and Uses.—This forms a diuretic mixture, which has been successfully and extensively used in gonorrhea, gleet, scalding of urine, and urinary affections. The dose is one fluidrachm, three times a day, in some tea or mucilage. It should be well agitated previous to taking it. There are various mixtures of Copaiba in use for the cure of gonorrhea, and as several of them have been found efficacious, I give the formula for preparing them :—

1. Take of Copaiba, Spirit of Nitric Ether, Compound Spirits of Lavender, Tincture of Muriate of Iron, of each, *one fluidounce*. Mix. The dose is a teaspoonful three times a day.

2. Take of Oil of Cubebs, Oil of Anise, Copaiba, Tincture of Opium, Tincture of Muriate of Iron, of each, *one fluidounce*. Mix. The dose is a teaspoonful three times a day. The two preparations above are very disagreeable to the taste, but very efficacious in gonorrhea, after the active symptoms have subsided. They must be agitated thoroughly, previous to taking each dose, and in order to protect the teeth from the injurious action of the acid in the Tincture of Muriate of Iron, it is

recommended to rinse the mouth immediately after taking each dose, with a solution of Bicarbonate of Potassa.

3. Take of Solidified Copaiba *two ounces*; White Wax *one ounce*; Oil of Cubebs, Oil of Spearmint, of each, *one fluidrachm*; Nitre, finely pulverized, *two drachms*. Melt the Wax, add the Oils, and then the Copaiba; stir all well together, and finally, add the Nitre. This forms a paste much used for the cure of gonorrhea. The dose, is a quantity about the size of a small chestnut, three times a day.

4. Take of Alum, in powder, *one drachm*; Precipitated Carbonate of Iron *half an ounce*; Pulverized Cubebs *one ounce*; Copaiba *a sufficient quantity* to form a kind of paste. The dose is the same as in the preceding preparation.

MISTURA GLYCYRRHIZÆ COMPOSITA. *Compound Liquorice Mixture.*

Preparation.—Take of Extract of Liquorice, in powder, Gum Arabic, in powder, Sugar, each, *half an ounce*; Camphorated Tincture of Opium *two fluidounces*; Tincture of Bloodroot *a fluidounce*; Spirit of Nitric Ether *half a fluidounce*; Water *twelve fluidounces*. Rub the Liquorice, Gum Arabic and Sugar with the Water gradually poured upon them; then add the other ingredients, and mix.

Properties and Uses.—This forms an excellent cough mixture, and may be used in catarrhal affections, after the subsidence of the more active symptoms, and when expectoration is present. For an adult the dose is a tablespoonful; for a child two or three years old a teaspoonful. It should be well agitated previous to taking it.

MISTURA OLEI CAMPHORATA. *Camphorated Mixture of Oils.*

Preparation.—Take of the Oils of Cloves, Cajeput and Amber, (rectified), and Camphor, each, *half an ounce*. Mix the Oils together, and dissolve the Camphor in the mixture.

Properties and Uses.—This is intended for the relief of toothache. The decayed portion of the tooth is to be cleansed and dried, and then a few drops of the mixture on cotton applied to the part; continue the application two or three times in the same manner, and leave the last in the tooth. This has proved very efficacious, and has been extensively sold throughout the country as “Parisen’s Vegetable Specific.”

It will not be amiss to give, at this place, another preparation for toothache, which I have found of service. Take of Opium, and Nitre, each, *two ounces*; Camphor *an ounce and a half*; Galls, in powder, *four ounces*; Alcohol *a pint and a half*. Place the articles in the Alcohol, macerate for fourteen days, and filter. To be applied the same as with the preceding mixture. Various other agents, as Solution of Tannic Acid, or Gallic Acid in Alcohol, etc., have been recommended for relieving toothache, but the above will be found to answer the purpose admirably. (*See Carvacrol.*)

MISTURA OLEI COMPOSITA. *Compound Mixture of Oils. Vermifuge Oil.*

Preparation.—Take of Castor Oil, and Wormseed Oil, each, *one ounce*; Oil of Turpentine, and Oil of Anise, of each, *half an ounce*. Mix together.

Properties and Uses.—This forms an efficacious remedy for worms, and may be given in teaspoonful doses to an adult, and repeated every two hours. After its employment for two or three days, a purgative must be administered.—*T. V. M.*

MISTURA SANGUINARIÆ COMPOSITA. *Compound Mixture of Bloodroot. Cough Drops.*

Preparation.—Take of Syrup of Ipecacuanha, Syrup of Squill, Tincture of Bloodroot, Syrup of Balsam Tolu, Camphorated Tincture of Opium, each, *one ounce*. Mix together.

Properties and Uses.—This is a very efficacious preparation in severe cough from colds, catarrhal or bronchial irritations. The dose is from half a fluidrachm to a fluidrachm whenever the fit of coughing is severe. I have used it for many years in practice, with much benefit. A very pleasant preparation for cough, is composed of Oil of Anise, Oil of Sweet Almonds, Tincture of Balsam Tolu, Canada Balsam, Madeira Wine, each, *one ounce*. Mix. The dose is from ten to twenty drops, three or four times a day, in a little elm or flaxseed infusion. It assists expectoration, and affords great relief in tickling coughs.—*J. K.*

MISTURA SPIRITUS VINI GALlici. *Brandy Mixture.*

Preparation.—Take of Brandy, Cinnamon Water, each, *four fluid-ounces*; the yolks of *two Eggs*; Refined Sugar *half an ounce*; Oil of Cinnamon *two minims*. Mix together.

Properties and Uses.—This forms a nutritive and stimulating preparation, especially adapted to the stage of prostration in low forms of fever, and in cases of much debility from various other causes.

MORPHIA.

Preparations of Morphia.

MORPHIA. *Morphia.*

Preparation.—Take of Opium, sliced, *a pound*; Solution of Ammonia *six fluidounces*; Distilled Water, Alcohol, and Animal Charcoal, of each, *a sufficient quantity*. Macerate the Opium with *four pints* of Distilled Water for twenty-four hours, and, having worked it with the hand, digest for twenty-four hours, and strain. In like manner, macerate the residue twice successively with the same quantity of Distilled Water, and strain. Mix the infusions, evaporate to six pints, and filter; then add firstly, five pints of Alcohol, and afterward three fluidounces of the

Solution of Ammonia, previously mixed with half a pint of Alcohol. After twenty-four hours, pour in the remainder of the Solution of Ammonia, mixed, as before, with half a pint of Alcohol; and set the liquor aside for twenty-four hours, that crystals may form. To purify these, boil them with two pints of Alcohol till they are dissolved, filter the solution, while hot, through Animal Charcoal, and set it aside to crystallize.—*U. S.*

History.—Water will extract Morphia from Opium as well as Acetic Acid, especially if the opium be, as directed, properly comminuted by working it with the hand, beside which, it possesses an advantage over acids in taking up less of the narcotina. The several macerations in water, assisted each time by kneading, nearly, if not quite, exhaust the drug of its morphia. The next step is to concentrate the infusions after having mixed them together; after this is effected, solution of ammonia is added to the concentrated infusion for the purpose of decomposing the meconate or other salt of morphia which may be present in it. The ammoniacal solution unites with the acid, and the vegetable alkali is precipitated; but as it usually carries with it a large proportion of coloring matter, which is very troublesome to remove, alcohol is previously added to the infusion. The alcohol dissolves the coloring matter as soon as it is separated by the ammonia, in consequence of which a much purer morphia is thrown down. By adding the ammonia in two portions, and at different stages of the process, the morphia is more slowly separated, and its impurities can be more readily removed, than if the whole were disengaged at once. Care must be taken to add no more ammonia than is necessary to saturate the acid present, for if there be an excess of ammonia, it will dissolve a portion of the morphia, and thus lessen the product. The first crystals obtained have a light-yellowish color; these are boiled in alcohol, and the solution filtered through animal charcoal, which removes all coloring matter.

In this process alcohol at 25° Baumé (sp. gr. 0.9032) is preferable to highly rectified spirit, as it is less liable to hold the morphia in solution when cold; and likewise, care should be observed in using a solution of ammonia of the officinal standard. Any morphia which may remain in the alcohol may be obtained by distillation of the latter, and when sufficiently concentrated, be purified by a separate operation.

By this process, the morphia obtained always contains a portion of narcotina, which may be removed by ether, which dissolves the latter principle, and leaves the morphia untouched. Or diluted acetic acid may be added, which will dissolve the morphia and leave the narcotina; the former may be obtained from the acetic solution by saturation of the acid with ammonia. Or, dissolve the morphia in dilute muriatic acid, and boil the solution with lime, which throws down the narcotina, and holds the morphia dissolved. The liquid being filtered yields the morphia

upon the addition of muriate of ammonia. Other means have been pursued, but it is not necessary to name them here.

Various other processes for procuring morphia have been pursued and proposed, but, probably, none are better adapted to the purpose, especially when small quantities are required, than the one given above, from the United States Pharmacopœia.

As opium varies in quality, so likewise does it vary in the proportion of the morphia which it contains; from nine per cent. to fourteen, is most commonly obtained, and much less than even nine per cent. when the drug is of very inferior quality, or when the process has been carelessly pursued and the opium not completely exhausted. The average amount of morphia yielded by opium may be stated at from ten to twelve per cent.

Morphia is in small, colorless, shining crystals, without odor, and quite bitter. At a moderate heat it parts with its water of crystallization, loses its crystalline form, and becomes opaque and white; if the temperature be increased, it melts and becomes a yellowish fluid from partial decomposition, which, upon cooling, assumes a white and crystalline appearance. When heated in the open air, it burns with a bright flame, and is wholly dissipated at a red-heat. It is nearly, if not quite, insoluble in cold water or ether; is sparingly soluble in cold alcohol; is soluble in somewhat less than one hundred parts of boiling water; is freely soluble in boiling alcohol, which deposits it on cooling; and is also partly dissolved by the fixed and vegetable oils. Its alcoholic solution changes red litmus paper to blue, and yellow turmeric to brown. It enters into combination with the acids, forming salts which are, for the most part, soluble, and decomposed by the alkalies. It is dissolved by solutions of potassa and soda, which, when exposed to the air, slowly precipitate it in consequence of the carbonic acid which they absorb. Solution of ammonia likewise dissolves it; so that in precipitating morphia by ammonia, great care must be taken to avoid adding it in excess. Nitric acid in contact with morphia or its salts, changes them to a blood-red color which finally becomes yellow. A solution of iodic acid, or an acidulous iodate is reddened by them, with evolution of iodine. With sesquichloride of iron, or the salts of the sesquioxide, morphia, its acetate and oxalate, form a fine blue color, which is destroyed upon the addition of a large quantity of water, or by acids or alkalies. Pseudomorphia, a principle discovered by Pelletier, and which is not possessed of poisonous properties, also becomes red under the action of nitric acid, and produces a blue color with the salts of sesquioxide of iron, so that these results are not positive indications of the presence of morphia. The terchloride of gold precipitates morphia at first yellow, then bluish, and finally violet. Potassa or soda precipitates morphia from its solutions, but redissolves it, when added in excess. Infusion of galls, and all vegetable solutions containing tannic acid precipitate morphia, forming a

tannate of morphia soluble in acetic acid. Pure gallic acid, according to Dublanc, does not precipitate it. The solutions of chlorine and morphia when mixed, become of a dark-brown color on the addition of ammonia, which is removed by a fresh addition of chlorine. Anhydrous morphia is stated to consist of one equivalent of nitrogen 14, thirty-five of carbon 210, twenty of hydrogen 20, and six of oxygen 48=292. The crystals contain about 5.8 per cent., or two additional equivalents of water 18=310.

Properties and Uses.—Morphia is the narcotic principle of opium, somewhat differing from this drug, however, in its effects upon the system, and which difference is, probably, owing to its peculiar combination with other principles existing in the opium. From its insolubility in water, it is less certain in its effects than some of its salts, as its manner and extent of action depend greatly on the presence or absence of acid in the stomach, as well as on the peculiar nature of the acid. Hence, its salts are always preferred, among which, the principal ones employed are the acetate, muriate, and sulphate. All these are soporific, anodyne, and diaphoretic, but differ from the actions of opium, in being less stimulating, less inclined to effect constipation, and less liable to produce the subsequent symptoms of headache, nausea, etc. Their principal employment is to abate pain, promote sleep, and tranquilize the system when in a state of restlessness from nervous irritation, or other cause. Opium, however, is more efficient in low forms of disease, as a stimulant, and also for the suppression of morbid discharges. In delirium tremens they are especially useful, and I have found more benefit in these cases, from the following preparation, than any other. Take of Sulphate of Quinia twelve grains; Sulphate of Morphia one grain; mix, and divide into six powders. Of these give one powder every hour, until the patient sleeps. Generally but two or three powders are required before the patient falls into a quiet sleep, with considerable moisture of the surface. Morphia and its salts are more acceptable to the stomach, in many cases, than opium or its tincture, and where they cannot be employed internally, from whatever cause, they may be applied upon a vesicated surface from which the cuticle has been removed, in double or triple the internal dose, and will exert the same influence upon the system as when received into the stomach. Thus applied, they are very effectual in relieving severe neuralgic pains, and in overcoming obstinate sickness of the stomach. The proper way is to apply them as near the affected part as possible, or, when it is desired to bring the system under its influence, to the epigastric region. Given in doses not sufficient to cause sleep, they frequently occasion troublesome cerebral symptoms, almost approximating delirium, but which gradually pass off spontaneously, or disappear upon the administration of another dose.

Given in large non-medicinal doses, morphia, as well as its salts, acts as a narcotic poison, requiring the same toxicological treatment as in the

case of poisoning by opium. Strong coffee has been used as an antidote, and with apparent benefit.

The dose of morphia and its salts, is from one-eighth of a grain to a quarter; and one-sixth of a grain is about equivalent to a grain of ordinary opium.

Off. Prep.—Morphiæ Acetas; Morphiæ Murias; Morphiæ Sulphas; Ferri et Morphiæ Tartras; Quiniæ et Morphiæ Tartras.

MORPHIÆ ACETAS. *Acetate of Morphia.*

Preparation.—Take of Morphia, in powder, (freed from narcotina by boiling with Sulphuric Ether), *an ounce*; Distilled Water *half a pint*; Acetic Acid *a sufficient quantity*. Mix the Morphia with the Water; then carefully drop in the Acid, constantly stirring, until the Morphia is saturated and dissolved. Evaporate the solution, by means of a water-bath, to the consistence of syrup. Lastly, dry the Acetate with a gentle heat, and rub it into powder. It should be kept in a darkened vial, as light gradually decomposes it—changing it to a dark color.—*U. S.*

History.—In this process, morphia is saturated with acetic acid, which is preferred to vinegar, on account of leaving no impurity in the acetate. The solution of the morphia in the water, upon the addition of a sufficient quantity of acetic acid, is evidence of its saturation; but a slight excess of acid is of no importance, as it is expelled during the evaporating process. The employment of too great a degree of heat must, however, be avoided, lest the salt become decomposed by losing a part of its acetic acid, and leaving a corresponding portion of its morphia undissolved. Crystals of acetate of morphia may be obtained provided the evaporation be checked at a certain point; but as it is always a matter of more or less difficulty, it is preferred to continue the evaporation to dryness. One advantage accruing from the use of diluted acetic acid of sp. gr. 1.004, in the preparation of the acetate, is, that while it dissolves the morphia, it leaves the narcotina, should any be present, untouched.

Acetate of morphia is in the form of a snowy white, obscurely crystalline powder, or if crystallized, it is in slender acicular and fasciculated crystals. It is inodorous, but possesses an intense, peculiar, bitter taste. Water dissolves it readily, though not entirely,—this is owing to a loss of some of its acid during evaporation to dryness, so that there is not enough present to hold the morphia in solution. Consequently, when it is required to use the acetate in solution, a few drops of distilled vinegar added, will render it completely soluble. It is not so readily soluble in alcohol as in water. A strong heat decomposes, and entirely dissipates it. Its aqueous solution, moderately concentrated, is affected by heat, nitric acid, and sesquichloride of iron, in the same manner as morphia; and the alkalies or alkaline earths precipitate morphia from it, but redissolve it if added in excess. Diluted sulphuric acid added to

the salt, disengages acetic fumes, and imparts an acetous odor to the solution. It is supposed to consist of one equivalent of base 296.35, one of acid 51.48, and one of water 9=356.83.

Owing to unskillful preparation it may be adulterated with coloring matter, which may be known by the want of its proper whiteness; but it may likewise, be adulterated with various white powders. In addition to the above tests of its purity, the following formula of the Edinburgh College will be found generally sufficient to detect the most part of adulterations: "One hundred measures of a solution of ten grains in a half a fluidounce of water and five minims of acetic acid, heated to near 212°, and decomposed by a faint excess of ammonia, yield by agitation a precipitate which in 24 hours occupies 15.5 measures of the liquid."

Properties and Uses.—Acetate of Morphia exerts a similar influence upon the system as the other salts of Morphia, and is preferred by some practitioners to them; but I have not found the combination of any acid to appreciably affect the therapeutical influence of the morphia. It may be substituted for opium, as a general rule, or for any of the other salts of morphia. The dose to produce an anodyne or soporific effect is from one-eighth of a grain to one-quarter; but under certain excitable conditions of the system, even more may be required. One-sixth of a grain is about equivalent to a grain of opium. It is sometimes used externally, applied to vesicated surfaces, for the purpose of affecting the system. Internally, it may be given either in the form of pill or solution. A solution (*Liquor Morphiæ Acetatis*) may be formed by adding ten grains of Acetate of Morphia to one fluidounce and a half of Distilled Water, to which add half an ounce of proof Spirit and five minims of Diluted Acetic Acid. The dose of this is from ten to fifteen drops. The alcohol is added to prevent spontaneous decomposition. (*See Ferri et Morphiæ Tartras.*)

MORPHIÆ MURIAS. MORPHIÆ HYDROCHLORAS. *Muriate of Morphia. Hydrochlorate of Morphia.*

Preparation.—Take of Morphia, in powder, *an ounce*; Distilled Water *half a pint*; Muriatic Acid *a sufficient quantity*. Mix the Morphia with the Water; then carefully drop in the Acid, constantly stirring, till the Morphia is saturated and dissolved. Evaporate the solution by means of a water-bath, so that it may crystallize upon cooling. Dry the crystals upon bibulous paper.—*U. S.*

History.—By the above process, Morphia is saturated with muriatic acid, of which saturation its complete solution in the water is an indication. An excess of acid may be known by litmus paper, which becomes reddened if such be the case.

Muriate of Morphia is usually met with in the form of a pure-white powder; but when crystallized it forms beautifully radiated tufts of delicate feathery or satiny needles. It is inodorous, intensely bitter, perma-

nent in the air, soluble in sixteen parts of water at 60° , and in its own weight at 212° , and is also soluble in alcohol. A concentrated boiling solution forms, on cooling, almost a firm crystalline mass. Muriate of Morphia is decomposed by diluted sulphuric acid, with disengagement of muriatic acid; strong nitric acid forms a deep-yellow solution with it; spirit of nitric ether slowly communicates a yellow color to its solution; the alkalies, especially potassa, and lime-water precipitate morphia from the solution, but redissolve it when added in excess. Heat, and sesquichloride of iron affect it in the same manner as they do morphia. Nitrate of silver added to its solution gives rise to a precipitate of chloride of silver. It consists of one equivalent of base 292, one of muriatic acid 36.42, and six of water $54=382.42$. According to Christison, the pure salt, dried at 150° , contains 12.7 per cent. of water.

Muriate of Morphia prepared by the above process is free from narcotina or other impurity, and the formula is sufficient for its preparation on a small scale; but when to be manufactured on a large scale, the process of Dr. Wm. Gregory will, probably, be found the most economical, by which a large and pure product may be obtained. By his process, the meconate of morphia existing in the opium is decomposed by chloride of calcium, which forms, through double affinity, a precipitate of meconate of lime, leaving muriate of morphia in solution, which is obtained in crystals by evaporation; these are purified by repeated solution, concentration, and crystallization, and lastly decolorization with animal charcoal. It is important to exhaust the opium with as little water as possible, so as to avoid protracted heat while evaporating. Other methods have been advised, but the one above given is sufficient for all practical purposes of the physician or apothecary.

White sugar is said to enter into muriate of morphia as an adulteration; it may be detected by the test of fermentation. The principal impurities, however, that are met with, are coloring matter and moisture, the result of carelessness in its preparation. According to the Edinburgh College, muriate of morphia should be snow-white, entirely soluble in water, giving a colorless solution; its loss of weight at 212° should not exceed thirteen per cent.; and one hundred measures of a solution of ten grains in half a fluidounce of water, heated nearly to 212° , and decomposed with agitation by a faint excess of ammonia, should yield a precipitate which in twenty-four hours occupies 12.5 measures of the liquid.

Properties and Uses.—Muriate of Morphia possesses properties similar to the other salts of morphia, having essentially all the actions of opium. It is much more extensively used in Great Britain than in this country; and may be employed as a substitute for opium, or the acetate, or sulphate of morphia. Its dose is from an eighth of a grain to a half; one-sixth of a grain is about equivalent to one grain of opium. A solution of the Muriate of Morphia (*Liquor Morphiæ Hydrochloras*) is made by

dissolving one drachm and a half of Hydrochlorate of Morphia, in a mixture of Rectified Spirit five fluidounces; Distilled Water fifteen fluidounces; aided by a gentle heat. Eighteen minims are equivalent to a grain of opium. The dose is from twenty to forty drops. The alcohol is added to this solution to prevent spontaneous decomposition.

MORPHIÆ SULPHAS. *Sulphate of Morphia.*

Preparation.—Take of Morphia, in powder, *an ounce*; Distilled Water *half a pint*; Diluted Sulphuric Acid *a sufficient quantity*. Mix the Morphia with the Water, then carefully drop in the Acid, constantly stirring till the Morphia is saturated and dissolved. Evaporate the solution by means of a water-bath, so that it may crystallize upon cooling. Dry the crystals upon bibulous paper.—*U. S.*

History.—In this process, as soon as the morphia in the water becomes completely dissolved, its saturation is indicated: to determine whether there has been an excess of acid added, litmus paper may be employed. The morphia used should be pure; if, however, it contains narcotina, this will remain in the mother-liquor, which generally contains a small portion of morphia with impurities, after the first crystallization. It should be purified, filtered, and again evaporated to obtain the remainder of the sulphate. It should be observed, that if the heat during evaporation be carried too far, decomposition will ensue, and a new body be formed destitute of morphia. Sulphate of morphia may also be obtained by dissolving the morphia in boiling alcohol of 36° Baumé (sp. gr. 0.8428), saturate it with sulphuric acid, while it is hot, add purified animal charcoal, boil for a few minutes, and filter the solution while at the boiling temperature. Most of the sulphate is deposited on cooling, and the rest may be procured by evaporation of the mother-liquor.

Sulphate of Morphia is obtained in white, mossy tufts or feathery crystals, which are inodorous, bitter to the taste, soluble in cold water, and in twice their weight of boiling water. According to Liebig they consist of 10.33 of sulphuric acid, 75.38 of morphia, and 14.29 of water. A heat of 248° will deprive them of 9.66 parts of their water, but any further loss will occasion decomposition. Their equivalent composition is given as one equivalent of base 292, one of acid 40, and six of water 54=386; five equivalents of the latter are water of crystallization, and may be separated by heat. The tests for its purity are those for sulphuric acid and for morphia. Pure Sulphate of Morphia is readily and entirely soluble in water, and nearly so in alcohol.

Properties and Uses.—Sulphate of Morphia is probably more often employed in this country than any other of the salts of this alkali, and is considered to be more uniform in its action on the system. It possesses the usual properties belonging to Morphia and its various salts, and is used in cases where these are indicated. The dose is from an eighth of a

grain to a quarter, which may be given in pill or solution. One-sixth of a grain is about an equivalent of one grain of opium. A Solution of Sulphate of Morphia, (*Liquor Morphiæ Sulphatis*,) is made by dissolving eight grains of the Sulphate of Morphia in half a pint of Distilled Water. This forms a convenient solution, in which the morphia may be administered in minute or ordinary doses to suit the occasion; it will keep for a long time unchanged. For an adult the full dose is one or two fluidrachms, which contain from an eighth of a grain to a quarter of the sulphate. Sometimes the sulphate of morphia is not entirely soluble in water, which may be owing to adulterations, but most commonly to the absence of care in its preparation, in which from want of sufficient water to hold the sulphate in solution, crystallization commences before the whole of the morphia has been saturated by the sulphuric acid. This difficulty may be overcome by the addition of a few drops of Sulphuric Acid, or eight or ten drops of Elixir Vitriol, and a fluidrachm of Alcohol, which will render the salt wholly soluble in water.

There are other salts of Morphia, as the *Nitrate*, *Phosphate* and *Tartrate*, prepared as the Acetate, by substituting the respective acids; also the *Hydriodate of Morphia*, made by mixing together strong solutions of Muriate of Morphia, two parts, and of Iodide of Potassium, rather more than one part. Wash the precipitate with a little Cold Water; press it between folds of blotting paper, redissolve in Hot Water, and crystallize. Doses of these, same as the Acetate. *Iodide of Morphia* is obtained by dissolving 120 equivalents of dry Acetate of Morphia in eight times the weight of Cold Distilled Water, adding, if necessary, a few drops of pure Acetic Acid, and mixing the filtered solution with a solution of sixty equivalents of Iodide of Potassium. After some time the salt crystallizes in very slender crystals, but which may be obtained of larger size, by heating the mixture on a water-bath, and allowing it to cool slowly. It closely resembles in form, color, etc., the Sulphate of Quinia. It is insoluble in Cold Water, soluble in Hot Water, and readily in Alcohol; the solutions have a bitter taste.

OLEA DESTILLATA.

Distilled Oils.

For an account of Volatile, Distilled, or Essential Oils, see *Olea Volatilia*, Part II, page 669.

The United States Pharmacopœia gives the following general directions for the preparation of Distilled Oils: "Put the substance from which the Oil is to be extracted into a retort, or other vessel suitable for distillation, and add enough Water to cover it, then distil into a large refrigerator. Separate the Distilled Oil from the Water which comes over with it. In this manner prepare *Oil of Anise* from *Anise*; *Oil of Caraway* from *Caraway*; *Oil of Cloves* from *Cloves*; *Oil of Wormseed*

from Wormseed; Oil of Cubebs from Cubebs; Oil of Fennel from Fennel Seed; Oil of Partridge Berry from Partridge Berry Leaves; Oil of Pennyroyal (*Oleum Hedeomæ*), from Pennyroyal; Oil of Juniper from Juniper Berries; Oil of Lavender from Lavender Flowers; Oil of Peppermint from Peppermint; Oil of Spearmint from Spearmint; Oil of Horsemint from Horsemint; Oil of Origanum from Origanum, (*Marjoram*); Oil of Pimento from Pimento; Oil of Rosemary from Rosemary Tops; Oil of Savine from Savine; Oil of Sassafras from Bark of Sassafras Root; and Oil of Valerian from Valerian." To which I will add Oil of Fleabane from Fleabane; and Oil of *Erechthites* from Fireweed.

The Edinburgh Pharmacopœia gives the following general directions:

"Volatile Oils are obtained chiefly from the Flowers, Leaves, Fruits, Barks, and Roots of Plants, by Distilling them with Water, in which they have been allowed to macerate for some time. Flowers, Leaves, and Fruits generally yield the finest Oils, and in greatest quantity when they are used fresh. Many, however, answer equally well if they have been preserved by beating them into a pulp with about twice their weight of Muriate of Soda, and keeping the mixture in well closed vessels.

Substances yielding Volatile Oils must be distilled with Water, the proper proportion of which varies for each article, and for the several qualities of each. In all instances, the quantity must be such as to prevent any of the material from being empyreumatized before the whole Oil is carried over. In operations where the material is of pulpy consistence, other contrivances must be resorted to for the same purpose. These consist chiefly of particular modes of applying Heat, so as to maintain a regulated temperature not much above 212° . On the small scale, Heat may be thus conveniently applied by means of a Bath of a strong Solution of Muriate of Lime, or by means of an Oil-Bath, kept at a stationary temperature with the aid of a thermometer.

On the large scale Heat is often applied by means of Steam under regulated pressure. In other operations it is found sufficient to hang the material within the Still in a cage or bag of fine network, and sometimes the material is not mingled with the Water at all, but is subjected to a current of Steam passing through it. The best mode of collecting the Oil is by means of a Refrigeratory, from which the Water and Oil drop together into a tall narrow vessel provided with a lateral tube or lip near the top, and another tube rising from the bottom to about a quarter of an inch below the level of the former. It is evident that with a Receiver of this construction the Water will escape by the lower tube; while the Volatile Oil, as it accumulates, will be discharged by the upper one, except in the very few instances where the Oil is heavier than Water. By attending to the general principles now explained, Volatile Oils may be readily obtained, of excellent quality, from the Flowers of *Anthemis Nobilis*, *Lavandula Vera* and *Ruta Graveolens*; from the Fruit of *Anethum Graveolens*, bruised; *Carum Carui*, bruised; *Eugenia*

Pimenta, bruised ; *Fœniculum Officinale*, bruised ; *Piper Cubeba*, ground, and *Pimpinella Anisum*, ground ; from the undeveloped Dried Flowers of *Caryophyllus Aromaticus* ; from the Tops of *Juniperus Sabina*, and *Rosmarinus Officinalis* ; from the entire Herb of *Mentha Piperita*, *M. Pulegium*, *M. Viridis*, and *Origanum Majorana* ; and also from the bruised Root of *Sassafras Officinale*.

The Dublin Pharmacopœia gives the following officinal directions :

“The VOLATILE or ESSENTIAL OILS may be obtained by the following general process : The substance from which the Oil is to be extracted is macerated for twenty-four hours, with five times its weight of Water, in a sheet tin, or copper Still, and, a condenser being then attached, half the Water is drawn over by Distillation, on the surface of which the Oil will be found to float, unless (which is rarely the case) it should be heavier than Water, when it will be found at the bottom of the receiver. The Oil having been separated, the aqueous product, which is a saturated solution of the Oil in Water, is to be returned to the Still, and the distillation resumed, and continued till the resulting liquid has the same volume as before. The Oil is again separated, the watery product returned to the Still, and the distillation resumed ; and this process is to be repeated until it ceases to afford any additional Oily product. The Oil thus obtained is to be separated as completely as possible from Water, and preserved in a well-stopped bottle.

In this way Volatile Oils may be obtained from the entire Herb of *Mentha Piperita*, *Mentha Pulegium*, *Mentha Viridis* ; from the Seeds or Fruit of *Carum Carui*, *Cubeba Officinalis*, *Eugenia Pimenta*, *Fœniculum Officinale*, *Juniperus Communis*, *Myristica Moschata*, *Pimpinella Anisum* ; from the Flowers of *Anthemis Nobilis*, *Lavandula Vera* ; from the undeveloped Dried Flowers of *Caryophyllus Aromaticus* ; from the Tops of *Juniperus Sabina*, *Rosmarinus Officinalis* ; from the Bark of *Cinnamomum Zeylanicum*. The Water distilled over in the preparation of the several Oils should be preserved for medical use.”

Volatile Oils are contained in cells, generally peculiar, and often so large as to be distinct to the naked eye. They frequently exist in such an abundance, that they may be obtained by mere expression, as with the Oils of Lemon, Orange, Bergamot, and Citron. Sometimes they exude spontaneously or from incisions, in combination with gum or resin, as in the case of Turpentine. And again, the Volatile Oil is not formed in the Plants, until the reaction of Water is obtained upon certain constituent principles, as in the case of the Oils of Black Mustard Seed, and Bitter Almonds, and perhaps Peach Leaves, Peach Kernels, etc. Most commonly it adheres with more or less force to the parts of the Plant containing it, either becoming destroyed or dispersed when the Plant is dried or retained in part or altogether, even when long kept.

Volatile Oils may be obtained from substances either in the Recent or Dried state; some articles must be used Fresh, from the fact that the Oil becomes lost by drying, as is the case with Roses, Orange Flowers, etc.; and the greatest yield is obtained from most of the Aromatic Plants by Distilling them while Fresh; though some believe that moderate desiccation ensures a larger product. When Dried substances are to be submitted to distillation, they should first be sliced, rasped, shaved, or bruised, according to the character of the agent, and then allowed to macerate in Water, until it has thoroughly penetrated them. Steam Heat is the best for the preparation of Oils, because it is less apt to injure them; but some Oils will not readily ascend with Steam at 212° , in consequence of which Water saturated with Salt is used, and which does not boil under 230° . It must be recollected that Volatile Oils are injured by Heat, and that in consequence, the temperature of the Heat employed in the Distillation should be as low as may be consistent for the ascent of the Oil.

The Water employed in distillation answers a two-fold purpose, that of regulating the Temperature, and thereby preventing the decomposition of the vegetable substance, and also that of facilitating the volatilization of the oil, which, though requiring a much higher temperature when distilled alone, yet readily rises with the vapor of water. Some attention, however, must be paid to the quantity of water used, because if in too large a quantity it may hold the oil in solution when the mixed vapors are condensed; and when in very large proportion, no oil whatever may be obtained separate. Again, if it be too small in quantity, the whole of the oil will not pass over, and the plant, by adhering to the sides of the vessel, will be burnt. More water is required for dried plants than for recent ones, and enough should always be added to cover the whole solid ingredient. The quantity of water together with that of the plant combined, should never exceed three-fourths of the capacity of the alembic, lest the liquor boil over. In cases where the oil is so small in quantity that it becomes dissolved in the water, it is removed by *cohobation*; a process which consists in redistilling the same water several times from fresh portions of the plant, till the quantity of oil which comes over exceeds the solvent power of the water. As the mixed vapors of oil and water are generally of a milky character when condensed, distillation should be continued as long as this milky appearance is observed in the condensed fluid which comes over. The oil is separated from the water by instruments adapted for the purpose, called *Separatories*, of which there are several in use, known as the *Florentine Receiver*, *Oil-separators*, etc. (See Procter's *Mohr and Redwood's Pharmacy*, pages 351-356.)

Volatile oils which have at first an unpleasant empyreumatic odor, should be allowed to remain for a few days in vessels loosely covered with paper, or until this peculiar odor has disappeared. They should

always be kept in well closed, dark bottles; otherwise they absorb oxygen from the atmosphere, become turbid, deposit resin, and lose the purity and richness of their aroma. These may, in a great measure, be restored by agitating them with animal charcoal recently heated; this will also answer the purpose of freeing them from water, which injures some oils.

“The following Table, showing the proportion of Volatile Oil obtained from the chief Medicinal Vegetable Substances, according to the most recent experiments, will be found useful in several ways. Among other things it illustrates several of the general statements now made as to the influence of modes of preparation and circumstances in vegetation upon the quantity of oil. The data are chiefly extracted or calculated from experiments by M. Raybaud in the *Journal de Pharmacie*, xx.—by Dr. Martius in *Repertorium für die Pharmacie*, xxxix.—by Dr. Bley in the same work, xlviii.—by M. Dann and by M. Voelter in the same work, lv.;—and a few have been added from experiments of my own. The numbers represent the number of ounces obtained from 100 pounds avoirdupois. The experiments of the continental authorities were commonly made on the large scale. My own were made on a small scale with the apparatus at page vii., and the graduated receiver at page xxxi.; and from a comparative trial in one or two instances upon a large scale, I am disposed to give the preference for accuracy to small operations, when they are carefully conducted. The letters before the figures refer to the authority for each.

Amygdalus communis. Bitter almond,	Ra.	0.38
Amygdalus communis. Bitter almond,	Vo.	7.70
Amygdalus communis. Bitter almond (Duflos),	0.8 to.	4.80
Angelica Archangelica,—dried root,	Ra.	4.50
Anthemis nobilis,—fresh flowers raised at Grasse,	Ra.	0.75
Anthemis nobilis,—dried flowers, do.	Ra.	1.38
Anthemis nobilis,—dried flowers, long kept, Germany,	Bl.	4.50
Anthemis nobilis,—flowers fresh dried,	Steer.	5.33
Anthemis nobilis,—flowers 12 months dried,	Steer.	3.0
Apium graveolens,—dried fruit,	Ra.	9.00
Apium Petroselinum,—fresh herb, after flowering,	Ra.	3.38
Apium Petroselinum,—dry fruit, France,	Ra.	12.0
Apium Petroselinum,—dry fruit, Germany,	Da.	30.0
Artemisia Absinthium,—fresh herb, Paris,	Ra.	12.0
Artemisia Absinthium,—dried herb, recent, Germany,	Ma.	6.0
Artemisia Absinthium,—dried herb, a year old, Germany,	Bl.	8.75
Artemisia Absinthium,—dried herb, 3 years old, Germany,	Ma.	5.0
Artemisia —? Wormseed of commerce,	Ra.	3.0
Artemisia —? Levant wormseed,	Vo.	10.8
Calamus aromaticus,—fresh root, Germany,	Ma.	16.0
Calamus aromaticus,—recently dried, Germany,	Bl.	17.5
Calamus aromaticus,—long dried, Germany,	Da.	14.3
Carum Carui,—dried fruit of French commerce,	Ra.	50.12
Carum Carui,—dried fruit of German commerce,	Ma.	66.5
Carum Carui,—do do	Da.	46.6
Carum Carui,—do do	Vo.	70.0
Caryophyllus aromaticus. Cloves, Bourbon,	Ra.	144.0
Caryophyllus aromaticus. Cloves, Cayenne,	Ra.	152.0
Caryophyllus aromaticus. Cloves, do.	Bl.	125.0
Caryophyllus aromaticus. Cloves, Molucca: French commerce,	Ra.	148.0
Caryophyllus aromaticus. Cloves, do English commerce,	Ra.	112.5

Caryophyllus aromaticus.	Cloves, average German commerce,.....	Vo.	226.0
Caryophyllus aromaticus.	Cloves, finest, do.....	Da.	250.0
Caryophyllus aromaticus.	Cloves, German commerce,.....	Steer.	272.0
Cinnamomum zeylanicum,	cinnamon of commerce,	Ra.	1.56
Cinnamomum Cassia,—cassia bark of commerce,		Ra.	12.0
Citrus Aurantium,—Sweet orange flowers, 1 May, <i>Nice</i> ,		Ra.	5.0
Citrus vulgaris,—Bitter orange flowers, 7 May, <i>Nice</i> ,		Ra.	5.9
Citrus vulgaris, do. do. 12 May, <i>Carmet</i> ,		Ra.	4.12
Citrus vulgaris, do. do. 16 July, <i>Paris</i> ,		Ra.	0.9
Citrus vulgaris, do. do. 14 Dec., <i>Paris</i> ,		Ra.	6.5
Citrus Aurantium,—rind of 100 oranges, by expression,		Ra.	2.5
Citrus Aurantium, do. by distillation,		Ra.	2.75
Citrus vulgaris,—rind of 100 oranges, by expression,		Ra.	4.0
Citrus vulgaris do by distillation,		Ra.	4.25
Citrus Limetta, rind of 100 limes, by distillation,		Ra.	2.12
Citrus Bergamium, rind of 100 bergamots, by distillation,		Ra.	2.9
Citrus Limonum, rind of 100 lemons by expression,		Ra.	1.9
Citrus Limonum, do. by distillation,		Ra.	1.4
Cochlearia Armoracia,—fresh seeds,		Ra.	0.9
Coriandrum sativum,—dry fruit of French commerce,		Ra.	2.3
Coriandrum sativum,—dry fruit of German commerce,		Da.	9.0
Oroton Eleutheria,—cascaquilla bark,		Bl.	5.62
Cuminum Cyminum,—dry fruit of French commerce,		Ra.	44.0
Cuminum Cyminum,—dry fruit of German commerce,		Bl.	32.5
Daucus Carota,—dry fruit,		Ra.	0.66
Daucus Carota,—fresh root,		Ra.	0.14
Dracocephalum moldavicum, flowering herb,		Ra.	2.10
Drimys Winteri,—Winter's bark (probably, however, only <i>Canella alba</i>), Ra.			0.50
Eugenia Pimenta,—pimenta berries, <i>Jamaica</i> ,		Ra.	12.38
Fœniculum* officinale—dry fruit of French commerce,		Ra.	33.0
Fœniculum* officinale,—dry fruit of German commerce,		Ma.	56.6
Fœniculum* officinale, do German commerce,		Bl.	83.0
Fœniculum* officinale, do German commerce,		Da.	60.4
Fœniculum officinale,—flowering herb, <i>Grasse</i> ,		Ra.	4.9
Fœniculum officinale,—herb after flowering, <i>Grasse</i> ,		Ra.	6.0
Galipea officinalis,—Casparia-bark of commerce,		Ra.	1.5
Genista canariensis, Rhodium-wood,		Ra.	0.47
Geum urbanum,—dry roots,		Ra.	0.53
Hyssopus officinalis,—flowering herb, <i>Grasse</i> ,		Ra.	5.30
Illicium anisatum,—star-anise-fruit,		Ra.	34.21
Illicium anisatum,—star-anise-fruit,		Da.	25.5
Juniperus communis,—green berries, 12 Sept.,		Ra.	3.9
Juniperus communis,—ripe berries, 1 Dec. <i>France</i> ,		Ra.	7.75
Juniperus communis, do. fresh, <i>Germany</i> ,		Da.	15.5
Juniperus communis, do. a year old, <i>Germany</i> ,		Ma.	10.8
Juniperus communis, do. a year old, <i>Germany</i> ,		Bl.	16.25
Juniperus Sabina,—fresh twigs, 5 March, <i>Grasse</i> ,		Ra.	19.05
Juniperus Sabina,—fresh twigs, 2 Oct. <i>Paris</i> ,		Ra.	14.25
Juniperus Sabina,—dried twigs, recent, <i>Germany</i> ,		Ma.	40.0
Juniperus Sabina,—dried twigs, a year old, <i>Germany</i> ,		Ma.	25.0
Larix Cedrus,—fresh cedar wood, <i>Paris</i> ,		Ra.	0.3
Larix Cedrus,—cedar wood of commerce,		Ra.	4.25
Laurus nobilis,—fresh leaves, 26 Jan. <i>Paris</i> ,		Ra.	5.25
Laurus nobilis,—leaves some years dried, <i>Germany</i> ,		Bl.	4.10
Laurus nobilis,—{ fresh leaves, } poor soil, low site,		Chr.	7.33
Laurus nobilis,—{ early in Oct. } poor soil, high site,		Chr.	6.9
Laurus nobilis,—{ near <i>Edinb.</i> } very fine soil, low site,		Chr.	17.12
Lavandula vera,—flowering herbs, 2 Aug. <i>Grasse</i> ,		Ra.	11.5
Lavandula vera, do 2 Aug. <i>Grasse</i> , north exposure, ...		Ra.	9.12
Lavandula vera,—flowering herb, 26 July <i>Soureillas</i> ,		Ra.	9.0
Lavandula vera,—herb after flowering, 26 Sept. <i>Soureillas</i> ,		Ra.	15.0
Lavandula Spica.—fresh herb, 24 July, <i>Paris</i> ,		Ra.	7.62
Lavandula Spica,—fresh herb, 4 Aug. <i>Grasse</i> ,		Ra.	12.5
Lavandula Stoechas,—dried spikes,		Ra.	6.43
Ligusticum Levisticum,—fresh herb, <i>Paris</i> ,		Ra.	1.12
Melissa officinalis,—fresh flowering herb,		Ra.	0.25

* It does not appear what is the exact species or variety of fennel understood by the authors of these four experiments, as they use the vague name of *Anethum Fœniculum*.

<i>Mentha piperita</i> ,—fresh tops in flower, <i>Grasse</i> ,	Ra.	6.25
<i>Mentha piperita</i> ,—fresh tops in flower, <i>Paris</i> ,	Ra.	3.40
<i>Mentha piperita</i> ,—dried tops in flower, <i>Germany</i> ,	Bl.	15.62
<i>Mentha piperita</i> ,—dried tops in flower, <i>Germany</i> ,	Ma.	21.0
<i>Mentha Pulegium</i> , fresh flowering herb,	Ra.	1.0
<i>Myristica moschata</i> ,—mace of commerce, finest,	Vo.	154.9
<i>Myristica moschata</i> ,—do. fine,	Bl.	125.0
<i>Myristica moschata</i> ,—do. worm eaten,	Bl.	65.6
<i>Myristica moschata</i> ,—nutmegs of commerce, fine,	Bl.	108.25
<i>Myristica moschata</i> ,—do. worm eaten,	Bl.	64.1
<i>Myrtus communis</i> ,—fresh leaves, Sept. 20— <i>Grasse</i> ,	Ra.	4.5
<i>Myrtus communis</i> ,—fresh leaves, Sept. 6— <i>Paris</i> ,	Ra.	2.5
<i>Origanum Majorana</i> ,—fresh flowering herb, Aug. 3— <i>Grasse</i> ,	Ra.	8.5
<i>Origanum Majorana</i> ,—fresh flowering herb, Aug. 3— <i>Paris</i> ,	Ra.	4.4
<i>Origanum vulgare</i> ,—fresh flowering herb, Sept. 15— <i>Paris</i> ,	Ra.	0.4
<i>Pimpinella Anisum</i> ,—dry fruit of French commerce,	Ra.	35.12
<i>Pimpinella Anisum</i> ,—dry fruit new, German commerce,	Ma.	37.5
<i>Pimpinella Anisum</i> ,—dry fruit, old,—German commerce,	Ma.	27.0
<i>Pimpinella Anisum</i> ,—dry fruit of German commerce,	Vo.	25.0
<i>Pimpinella Anisum</i> , do. do.	Da.	43.75
<i>Piper Cubeba</i> ,—Cubebbs of French commerce,	Ra.	19.5
<i>Piper nigrum</i> ,—White pepper of do.	Ra.	16.0
<i>Piper nigrum</i> ,—Black pepper of do.	Ra.	18.12
<i>Prunus Lauro-cerasus</i> ,—fresh leaves, November 23,— <i>Paris</i> ,	Ra.	2.12
<i>Prunus Lauro-cerasus</i> { fresh leaves } undeveloped, June 7,	Chr.	10.13
<i>Prunus Lauro-cerasus</i> { from the same } half-grown, June 7,	Chr.	7.20
<i>Prunus Lauro-cerasus</i> { plants: near } full-gr. 8 weeks on tree, Jy. 15, Chr.		4.96
<i>Prunus Lauro-cerasus</i> { <i>Edinburgh</i> , } 12 months on tree, June 2, ...	Chr.	1.04
<i>Prunus Lauro-cerasus</i> { Fresh leaves of the same } 3 mo. on tree, ...	Chr.	7.04
<i>Prunus Lauro-cerasus</i> { plant, 1 Sept. 1836, <i>Edin.</i> } 15 mo. on tree, ...	Chr.	2.24
<i>Renealmia Cardamomum</i> ,—lesser cardamoms,	Ra.	11.42
<i>Rosa centifolia</i> , fresh flowers, <i>Grasse</i> ,	Ra.	0.25
<i>Rosmarinus officinalis</i> ,—fresh flowering herb, <i>Grasse</i> ,	Ra.	5.0
<i>Rosmarinus officinalis</i> , do. <i>Paris</i> ,	Ra.	3.5
<i>Ruta graveolens</i> , fresh flowering herb, 20 July, <i>Grasse</i> ,	Ra.	4.12
<i>Ruta graveolens</i> , do. 28 July, <i>Paris</i> ,	Ra.	0.63
<i>Ruta graveolens</i> ,—flowering herb, newly dried, <i>Germany</i> ,	Bl.	4.4
<i>Ruta graveolens</i> ,—dried seeds, <i>South of France</i> ,	Ra.	19.0
<i>Salvia officinalis</i> , v. <i>minor</i> ,—fresh herb, 12 Mar. <i>Grasse</i> ,	Ra.	6.0
<i>Salvia officinalis</i> , v. <i>minor</i> ,—fresh herb, 14 June, <i>Paris</i> ,	Ra.	2.5
<i>Salvia officinalis</i> , v. <i>major</i> ,—fresh herb, 12 Mar. <i>Grasse</i> ,	Ra.	4.0
<i>Salvia officinalis</i> , v. <i>major</i> ,—fresh herb, 14 June, <i>Paris</i> ,	Ra.	3.05
<i>Santalum album</i> ,—sandal wood of commerce,	Ra.	5.0
<i>Sinapis nigra</i> ,—black mustard-seed, <i>Germany</i> , 12 months old,	Da.	3.9
<i>Sinapis nigra</i> ,—black mustard-seed, <i>Germany</i> , fresh,	Da.	5.0
<i>Sinapis nigra</i> ,—black mustard-seed, <i>France</i> , fresh,	Da.	7.75
<i>Sinapis nigra</i> ,—black mustard-seed, <i>France</i> ,	Vo.	9.1
<i>Tanacetum vulgare</i> ,—fresh flowering herb, 9 July, <i>Grasse</i> ,	Ra.	1.2
<i>Tanacetum vulgare</i> ,—fresh flowering herb, 25 July, <i>Paris</i> ,	Ra.	5.8
<i>Tanacetum vulgare</i> ,—fresh tops, <i>Germany</i> ,	Da.	5.0
<i>Tanacetum vulgare</i> , dried flowering herb, <i>Germany</i> ,	Bl.	15.6
<i>Thuya occidentalis</i> , { fresh } Aged, stunted tree; exposed. Oct. 21. ...	Chr.	10.8
<i>Thuya occidentalis</i> , { twigs } Aged, vigorous; sheltered. Oct. 21. ...	Chr.	10.25
<i>Thuya occidentalis</i> , { near } Young, vigorous; exposed. Oct. 9. ...	Chr.	18.25
<i>Thuya occidentalis</i> , { <i>Edin.</i> } Young, vig.; exposed; fine soil. Sept. 26	Chr.	26.40
<i>Thymus Serpyllum</i> ,—fresh flowering herb, 6 Aug., <i>Grasse</i> ,	Ra.	5.0
<i>Thymus Serpyllum</i> ,—fresh flowering herb, 5 July, <i>Paris</i> ,	Ra.	0.9
<i>Thymus vulgaris</i> ,—fresh flowering herb, 16 Aug., <i>Grasse</i> ,	Ra.	6.5
<i>Thymus vulgaris</i> ,—fresh flowering herb, 13 July, <i>Paris</i> ,	Ra.	3.75
<i>Valeriana officinalis</i> ,—dry root, a year old, <i>Germany</i> ,	Bl.	30.16
<i>Valeriana officinalis</i> ,—the root, <i>Germany</i> ,	Da.	15.0
<i>Valeriana officinalis</i> ,—the root, <i>Germany</i> ,	Vo.	10.5
<i>Verbena odorata</i> ,—fresh flowering herb, <i>Paris</i> ,	Ra.	3.1
<i>Zingiber officinale</i> ,—dry root of commerce,	Ra.	10.8

The facts in the preceding table seem to show that the flowers of *Anthemis Nobilis*, the berries of *Juniperus Communis*, and the root of *Acorus*

Calamus may be both dried and long kept, without material loss of volatile oil; but that the herb of *Artemisia Absinthium* and the tops of *Juniperus Sabina*, though they may be dried, cannot be long preserved, without loss. It farther appears that the seed of *Sinapis Nigra* cannot be long kept without material loss; and that the mace and kernel of *Myristica Moschata* suffer greatly in their proportion of oil, when attacked by worms. The influence of season is well exemplified in the case of the flowers of *Citrus Aurantium*, which is well known to flower at different periods of the year. The effect of climate is equally well shown in many examples, such as the wood of *Larix Cedrus*, the herb or flowering tops of *Lavandula Vera*, *Lavandula Spica*, *Mentha Piperita*, *Myrtus Vulgaris*, *Origanum Majorana*, *Rosmarinus Officinalis*, *Thymus Serpyllum*, *Thymus Vulgaris*, *Tanacetum Vulgare*, and the seeds of *Sinapis Nigra*. Under this head, the great superiority of Grasse, in the south of France, over Paris for raising plants for distilling oils, is remarkable. The effect of soil or site is exhibited in my own experiments with the leaves of *Laurus Nobilis* and *Thuya Occidentalis*; and that of the progress of vegetation is excellently shown in the instances of the herb of *Foeniculum Officinale* and *Lavandula Vera*, the berries of *Juniperus Communis*, but above all, the leaves of *Prunus Laurocerasus*. Farther, the table presents many examples, but especially under *Caryophyllus Aromaticus*, *Carum Carui*, *Coriandrum Sativum*, and *Illicium Anisatum*, of great differences prevailing in the relative proportion of volatile oil, and consequently in relative activity, between different specimens of the same vegetable substances as it occurs in ordinary commerce. In conclusion, it should be observed, that the circumstances most favorable to the proportion of volatile oil are not necessarily always most favorable to its quality. Raybaud mentions, that the cloves of English commerce, which will be seen (*Caryophyllus Aromaticus*) from the table to have furnished the lowest proportion of oil, produce it of finer quality than other kinds he examined. And lavender, which yields considerably more volatile oil after flowering than during inflorescence (*Lavandula Vera*), produces in the latter case an oil of more delicate fragrance than in the former; and it is not so acrid."

The above useful information is extracted from Christison's Dispensatory, and will, undoubtedly, prove serviceable to the apothecary and manufacturing chemist.

As it is sometimes required to know the number of drops which certain volatile oils yield to a fluidrachm, the following table, extracted from the U. S. Dispensatory, and made out by Professor Procter, will be found of some value; although it must be recollected that, as the size and number of drops depend upon the shape of the part from which they fall, these results are only approximative and relative:

"The columns of figures represent the number of drops in a fluid drachm of the oils respectively, the first column giving those obtained

by dropping the oils from the bottles in which they are commonly kept, the second by dropping them from a minim measure.

Oleum Anisi	85	86	Oleum Menthæ Piperitæ	103	109
“ Carui	106	108	“ Menthæ Viridis	89	94
“ Caryophylli	103	103	“ Rosmarini	104	105
“ Chenopodii	97	100	“ Sabinæ	102	108
“ Cinnamomi	100	102	“ Sassafras	102	100
“ Cubebæ	86	96	“ Tanacetii	92	111
“ Fœniculi	103	103	“ Valerianæ	116	110
“ Gaultheriæ	102	101	Creasotum	95	91
“ Hedeomæ	91	91			

Volatile oils possess almost universally the peculiar medicinal properties of the plants from which they are obtained. They are most commonly used in the form of alcoholic tincture, under the name of *Essences*, but may also be given dropped on a lump of sugar, triturated with ten or twelve times their weight of sugar, forming an *oleo-saccharum*, and then dissolved in water, or they may be made into an emulsion with water, sugar, and gum Arabic.

OLEUM ANISI. *Oil of Anise.*

History.—This may be prepared according to the process of the U. S. Pharmacopœia; the seed yields, according to various authors, from 1.56 to 3.12 per cent. of oil. The oil is colorless or yellowish, possesses a powerful odor and taste of the seed, and its specific gravity varies from 0.9768 to 0.9903, increasing with its age. At 50° it forms a concrete crystalline mass, and does not melt under 62°. Alcohol of 0.840 dissolves only 42 per cent. of the oil, but which is readily soluble in alcohol of 0.806. It contains *Stearoptene*, a principle of volatile oils which is solid at ordinary temperatures, and is heavier than water; and *Eleoptene*, another principle, which is fluid and more volatile. Both principles are said to have the same ultimate composition, consisting of ten equivalents of carbon, six of hydrogen, and one of oxygen ($C_{10}H_8O$). When long kept the stearoptene becomes liquid, which is owing to absorption of oxygen from the atmosphere. Spermaceti, wax, or camphor is sometimes added to oil of anise as adulterations; they may be known by the odor of the latter, and the insolubility of the former in alcohol. Nearly all the oil used in this country is imported.

Properties and Uses.—Carminative and antispasmodic, and especially adapted to flatulency and colic of infants. It likewise, in connection with aqua ammonia, affords relief in spasmodic cough. The dose is from five to fifteen drops. The oil of star aniseed (*Oleum Badiani*) has the flavor of anise, and is frequently substituted for it.

Off. Prep.—Extractum Spigeliæ et Sennæ Fluidum; Mistura Cajuputi Composita; Tinctura Anisi; Tinctura Opii Camphorata.

OLEUM ANTHEMIDIS. *Oil of Chamomile.*

History.—Oil of Chamomile is obtained by distillation of Chamomile

Flowers with Water, a thousand parts of which yield about eight parts of oil; when first obtained it is greenish or bluish, but finally becomes yellowish-brown; its specific gravity is about 0.9083. It has the odor of chamomile flowers, and an aromatic, somewhat pungent taste. It is said to be a mixture of carbo-hydrogen with an oxygenated oil. It is prepared in Europe.

Properties and Uses.—Oil of Chamomile is tonic and antispasmodic; and has been found very serviceable in spasm of the stomach, painful dysmenorrhea, hiccough, pertussis, and to prevent or lessen the griping influence of some cathartics. The dose is from five to fifteen drops. The *Matricaria Chamomilla* furnishes a thick, opaque, dark-blue oil, becoming brown and unctuous by age, and which is sometimes used under the name of Oil of Chamomile. It is less antispasmodic than the true chamomile oil.

OLEUM BERGAMII. *Oil of Bergamot.*

History.—Oil of Bergamot is the volatile oil of the rind of the fruit of *Citrus Limetta*, from which it is procured by expression, in the same manner as for obtaining the oil of lemon. It is imported from Italy, Portugal, and the South of France. It may be obtained by distillation, but the product is not so agreeable as by expression. The bergamot tree has small and white flowers; oblong-ovate, acute or obtuse, dentate leaves, paler on the under surface, with winged or margined petioles; and the fruit is roundish or pyriform, terminated by an obtuse point, with concave receptacles of oil in the rind; its pulp is acid, rather aromatic, and pleasant to the taste; its rind is pale-yellow, shining, abounding in oil. The oil has a peculiar, agreeable, rich fragrance, somewhat resembling oil of lemons but more grateful, a bitter, aromatic, pungent taste, and a pale greenish-yellow color. Its specific gravity is 0.885, and it may be determined from oils of orange and lemon, by its ready solubility in liquor potassa, forming a clear solution. In composition, it resembles the oil of lemons.

Properties and Uses.—Gently excitant; but is used almost exclusively as a perfume.

OLEUM CAJUPUTI. *Cajeput Oil.*

History.—This oil is obtained from the leaves of *Melaleuca Cajuputi*, a tree growing in the Moluccas and neighboring islands, and belonging to the *Nat. Ord.*—Myrtaceæ, *Sex. Syst.*—Polyadelphia Icosandria. It is a small tree, with an erect but crooked stem, and scattered branches, the slender twigs of which droop like those of the weeping willow, (*Salix Babylonica*). The bark is soft, spongy, lamellated, of a whitish ash color, throwing off its exterior layer from time to time in flakes, like the birch tree. The petioles are short, and the leaves are alternate, lanceolate, sericeous when young, smooth when full grown, deep green, three and five-nerved, slightly falcate, entire, from three to five inches in

length, from one-half to three-quarters of an inch broad, and exhaling a strong aromatic odor, when bruised. The *flowers* are small, white, inodorous, sessile, and disposed in terminal and axillary downy spikes, with solitary, lanceolate, three-flowered bracts. The *filaments* are three or four times longer than the *petals*, and both are inserted in the rim of the calyx.

Cajeput oil is obtained by distillation of the Leaves, which yield it only in small proportion; this, together with the extensive employment of it in India, renders it a costly article. It is imported from the East Indies in glass bottles. The leaves are collected in the autumn, allowed to steep for a night, and then distilled in copper vessels. The oil is very liquid, transparent, of a grass-green color, a strong penetrating odor partaking both of camphor and of cardamom, and a warm, pungent taste, succeeded by an impression of coolness. Its green color may be removed by rectification, and is not essential; nor is it owing to the presence of copper, as was at one time supposed. True, it sometimes contains copper, but the pure green oil has, given no indications of the presence of this metal. Copper may be added to imitate or preserve the green color, but its proportion is so small, as not to interfere with the internal use of the oil; from a pound of the oil of commerce, Guibort procured only two and a half grains of oxide of copper. The copper may be separated from the oil by distillation with water, or by agitation with a solution of ferrocyanuret of potassium. Oil of Cajeput is volatile, inflammable, leaving no residue after burning, wholly soluble in alcohol, and of the specific gravity, varying from 0.914 to 0.9274. Sulphuric and nitric acids exert but little action on it. When distilled, a colorless oil first comes over of sp. gr. 0.897, and then a green oil, denser, weaker in odor, but more acrid. It is composed of ten equivalents of carbon 60, nine of hydrogen 9, and one of oxygen 8=77.

In consequence of its high price it is very subject to adulteration. Oils of rosemary or turpentine, impregnated with camphor and bruised cardamom seeds, and colored with resin of milfoil, are often sold as genuine oil. Zeller considers iodine the best test, the addition of which, reacts moderately energetic, with but a slight increase of temperature, and a faint development of orange-colored vapors, after which inspissation takes place, and soon results in a dry, greenish-brown, brittle mass. The genuine oil, it must be recollected, burns entirely away leaving no residue; and beside the test above given, copper may be detected by dissolving the residuum which is left after burning the oil in nitric acid, which becomes violet-colored when ammonia is added in excess.

Properties and Uses.—Cajeput Oil is a powerful diffusive stimulant, diaphoretic, and antispasmodic. When swallowed it occasions a sense of heat, with an increased action of the pulse, and occasionally profuse diaphoresis. It is very much esteemed in the islands of the Indian ocean, the inhabitants of which employ it extensively in rheumatism, palsy,

epilepsy, and many other diseases; using it both internally and as a local application. It may be advantageously employed internally in chronic rheumatism, hysteria, colic, spasms or cramps of the stomach or bowels, cholera-morbus, Asiatic cholera, in the typhoid stage of fevers, and wherever a powerful stimulant is required. It should never be given internally when inflammation is present. Externally, it is very beneficial as an application to rheumatic, neuralgic, and other pains, and may be used alone, or in combination with other oils. Applied to the cavity of a carious tooth, it relieves toothache. The dose is from one to ten drops, on sugar, or in emulsion.

Off. Prep.—Mistura Cajuputi Composita; Mistura Olei Camphorata; Tinctura Camphoræ Composita.

OLEUM CARL. OLEUM CARUI. *Oil of Caraway.*

History.—This oil is easily separated by distillation of the fresh fruit with water, which yields on an average about 4.7 per cent. It is at first pale-yellow, but becomes brownish by time, possesses the odor of the fruit, with an aromatic acid taste. Its specific gravity is variously given as 0.946 and 0.931. It consists principally of a hydro-carbon, $C_{10}H_8$, *Carvene*, and an oxygenated oil, *Carvacrol*.

When Oil of Caraway is distilled with hydrated phosphoric acid, the distilled liquor being poured back into the retort until it ceases to have the smell of caraway, an oily liquid separates from the phosphoric acid, having a very disagreeable odor, and a strong taste, which is called *Carvacrol*. Or, if a saturated solution of iodine be distilled with Oil of Caraway, until no more hydriodic acid is formed, a red mass will be formed in the retort. This must be acted upon by potassa, and the yellow solution distilled. *Carvene* passes over, and the *Carvacrol* remains; this must be purified by redistillation.

Properties and Uses.—Oil of Caraway is a warm diffusible stimulant and carminative. It is frequently used to correct the griping and nauseating effects of medicines, also to increase their flavor. It is considerably used in cake and confectionary. The dose is from one to five or ten drops. *Carvacrol* placed on cotton, and inserted into the cavity of a carious tooth, is said to give immediate relief.

Off. Prep.—Extractum Spigeliæ et Sennæ Fluidum.

OLEUM CARYOPHYLLI. *Oil of Cloves.*

History.—Oil of Cloves is procured by distillation of bruised cloves with water, to which salt is usually added to increase the temperature; the cloves should be thoroughly exhausted by repeatedly distilling from the same cloves the water which comes over. Good cloves yield from a fifth to a sixth of their weight of oil. Formerly, the oil was imported from Europe or the East Indies, but at present, it is prepared in this country from the Cayenne cloves, seven to nine parts of which yield one part of oil.

When first obtained, oil of cloves is very fluid, transparent, and colorless, but gradually becomes yellowish, and finally reddish-brown. It has the strong, peculiar odor of cloves, and an aromatic, intensely acrid, burning taste. It sinks in water, in which it is sparingly soluble, and is completely soluble in alcohol, ether, acetic acid, and the fixed oils. Its specific gravity is between 1.034 and 1.061. Nitric acid changes it to a deep-red, and forms oxalic acid by the application of heat. It is less volatile than most of the other essential oils, and congeals only at -4° F. It deposits a crystalline *stearoptene* on long standing. It consists of two oils, one of which is lighter than water, the other heavier. They may be separated by distilling the crude oil from a solution of potassa, the *light, colorless oil* passes over with the watery vapor; its density is 0.918, consists of carbon and hydrogen, and is isomeric with pure oil of turpentine, $C_{10}H_8$. It is said to be destitute of active properties. The *heavier oil* remains in union with the potassa, from which it may be obtained by the addition of sulphuric acid, and then distilling. It is likewise colorless, but becomes darker by age, possesses the peculiar odor and taste of cloves, boils at 470° , is of the specific gravity 1.079, forms soluble and crystallizable salts with the alkalies, earths, and oxides of the common metals, and is hence called *Eugenic* or *Caryophyllic Acid*. It is composed of $C_{24}H_{15}O_5$. The crude oil of cloves consists of carbon 20, hydrogen 12, oxygen 5.

Oil of cloves is frequently adulterated with fixed oils, oil of pimento, and copaiba. It may be detected by observing that the pure oil sinks in distilled water. Zeller states that its purity may be known by its congealing into a crystalline mass with the alcoholic solution of potassa, at the same time being deprived of its peculiar odor.

Properties and Uses.—Oil of Cloves is stimulant and irritant, and is much used as a corrector of other medicines, and as an external counter-irritant. It is frequently introduced on cotton into the cavity of a carious tooth to relieve toothache. Its dose is from two to six drops on sugar, or in emulsion.

Off. Prep.—Mistura Cajuputi Composita; Mistura Olei Camphorata; Pilulæ Aloës Compositæ.

OLEUM CHENOPODII. *Oil of Wormseed.*

History.—Oil of Wormseed is prepared in this country; that which is procured from manufacturers in the vicinity of Baltimore is the most esteemed. It is obtained by distillation of the bruised seed or ripe tops of the plant with water, and when first obtained is of a light yellow color, but becomes darker by age. It possesses the odor and taste of the plant, and has the specific gravity of 0.908. An oil of less strength is prepared in the Western States from the leaves, stalks, and seed of the matured plant, and, probably, possesses similar properties when given in larger doses. That from the seeds always commands the highest price.

Properties and Uses.—This oil is used only as an anthelmintic. Its dose is from four to eight drops for a child, repeated twice a day for three or four days, and then followed by a brisk cathartic. It forms the basis of several popular nostrums for worms.

Off. Prep.—Mistura Chenopodii Composita; Mistura Olei Composita.

OLEUM CINNAMOMI. *Oil of Cinnamon.*

History.—Oil of Cinnamon is obtained by macerating coarsely powdered Cinnamon Bark for two days in Sea Water, adding Muriate of Soda, and then distilling. About one-third of the oil which comes over is light and floats upon the Water, while the rest sinks, and this separation of the two oils continues for several days. The Water used in the distillation being saturated with the Oil, is reserved for future distillations. Cinnamon Bark yields about eight ounces of oil from eighty pounds, and even less, if the bark be a few years old. The two oils procured by the distillation, differ, apparently, only in density; and in the oil of commerce they are probably united. When freshly prepared Oil of Cinnamon is of a light yellow-color, which gradually changes to cherry-red. It has the odor of cinnamon, and also its taste in a concentrated state. It is readily soluble in alcohol, and has the specific gravity varying from 1.035 to 1.041. Exposed to the air, it absorbs oxygen, and deposits colorless, sourish, volatilizable crystals, which are soluble in alcohol, sparingly so in water, and which may be converted into benzoic acid by the action of nitric acid and heat; these crystals are called *Cinnamic* or *Cinnamonic Acid*, and may be frequently observed in bottles which have held the oil for a long time. When taken internally, these crystals give rise to the presence of hippuric acid in the urine, the same as with benzoic acid. Two distinct resins and water, are also the result of exposure to atmospheric action; one of these resins is soluble in hot alcohol, but sparingly in cold, while the other is soluble in either. Concentrated nitric acid, added very gradually to oil of cinnamon to avoid violent action, converts it speedily into a mass of crystalline scales, which are considered to be a compound of the oil and acid. *Cinnamyle* ($C_{18}H_7O_2$) is the name given to a hypothetical compound radical of oil of cinnamon, which forms oil of cinnamon by uniting with one equivalent of hydrogen, and anhydrous cinnamic acid, when united with one equivalent of oxygen.

Oil of Cassia, or Chinese Oil of Cinnamon, very much resembles the Ceylon oil in color, odor, and taste; the latter, however, is inferior. It is sold at a much less price than the Ceylon Oil of Cinnamon. The chemical reactions of the two oils are the same. Zeller states that they differ somewhat, the Chinese oil being heavier than the Ceylon, less liquid, and sooner rendered turbid by a decrease of temperature; that iodine dissolves rapidly in the latter, with increase of heat, and the production of a tough residue or extract, while in the Cassia oil its solution is quiet, slow, with little heat, and a soft or liquid residue.

Properties and Uses.—Oil of Cinnamon is stimulant, aromatic, antispasmodic, and carminative. It is frequently used to correct the taste of medicines, and is given as a stimulant in flatulent colic, gastrodynia, and languor from gastric debility. It undoubtedly exerts an influence upon the uterus, and will be found valuable in uterine hemorrhage, in the form of alcoholic tincture. The tincture of the bark is frequently administered for this purpose, but I know from experience, that although destitute of astringency, yet the tincture or essence of the oil has the same, if not a better action, in such cases; again, it is an unsafe remedy to exhibit during pregnancy, as it is very apt to produce miscarriage. The essence, or even cordial of cinnamon, stimulates the generative organs, and produces an aphrodisiac influence. The dose of oil of cinnamon is one or two drops, given in emulsion; of the essence from half a fluidrachm to a fluidrachm, given in a wineglass of sweetened water. Ten drops of oil of cinnamon added to a fluidrachm of olive oil, gently heated, and rubbed upon the spine, will frequently quiet a restless, fretful child suffering with flatulence or colic, and cause it to sleep; if the rubefacient power requires to be increased, ten drops of aqua ammonia may be added.

OLEUM COPAIBA. *Oil of Copaiba.*

Preparation.—Take of Copaiba two pounds; Water four gallons. Add the Copaiba to the Water in a tinned still, and, having adapted a proper refrigeratory, distil three gallons. Separate the Oil which comes over from the Water, return the latter to the Copaiba, and again distil three gallons. Lastly, separate the Oil obtained in the second distillation, add to it that first obtained, and keep the whole in a well stopped bottle.—*U. S.*

History.—The more recent the Copaiba the greater is the amount of volatile oil obtained. Usually about one-third or one-half of the Copaiba is procured in oil, and it is stated that one specimen yielded 80 per cent. The oil has the taste and odor of copaiba, is colorless, or pale-yellow, according to the variety of copaiba employed, has the specific gravity of 0.910, boils at about 470°, and is very soluble in alcohol and ether. It forms crystals of artificial camphor by absorption of muriatic acid gas, is composed of carbon 10, hydrogen 8, being isomeric with pure oil of turpentine. It is considered a better preservative of potassium than naphtha, on account of its entire freedom from oxygen. It is best prepared by steam heat. The fine greenish colored oil which comes over during the latter part of the distillation, may be rendered colorless by redistillation.

Properties and Uses.—The Oil of Copaiba exerts an influence upon the system, similar to that of copaiba, to which it is preferred on account of the smaller dose required, and its non-tendency to cause nausea. It enters into many of the nostrums of the day for the cure of gonorrhea.

The dose is ten or fifteen drops, which should be given in syrup, peppermint or cinnamon water, mucilage, or emulsion.

OLEUM CUBEBAE. *Oil of Cubebs.*

History.—Cubebs ground, and distilled with water, furnish about seven per cent. of this oil. It is a thick, colorless oil, but as commonly met with has a greenish or yellowish tint. It possesses the peculiar taste and odor of the berries, is lighter than water, being of specific gravity 0.929, and thickens on exposure to the air without being deprived of its odor; occasionally it deposits crystals, which are supposed to be a hydrate of the oil. It is composed of carbon and hydrogen, $C_{15}H_{12}$.

Properties and Uses.—Oil of Cubebs may be substituted for the powdered berries, in many instances, with benefit. It is less pungent than the oleo-resin or fluid extract, and is, probably, only one of the active principles of cubebs. The dose is ten or twelve drops, three times a day, gradually increased, as the stomach will permit, or until it produces some decided results. It may be given in syrup, emulsion, or in the form of capsules, like copaiba.

OLEUM ERECHTHITI. *Oil of Fireweed.*

History.—This oil is obtained by distilling the plant *Erechtites hieracifolius* with water. As obtained in the shops, it is quite fluid, transparent, yellowish in color, of a strong, peculiar, fetid and slightly aromatic odor, and a fetid, bitterish, burning taste. In its odor and taste it somewhat resembles the Oil of Fleabane. It is soluble in alcohol. No analysis has been made of it.

Properties and Uses.—The therapeutical actions of Oil of Fireweed are not well understood. It seems to resemble the Oil of Fleabane in its influence upon various hemorrhages, and for which agent it is frequently substituted; and is considered by many to be the most efficacious, in such cases, of the two oils. It also exerts a beneficial effect on mucous surfaces, and has been successfully used in diarrhea, dysentery, hemorrhoids, etc. As an antispasmodic it has been found of value in spasms of the stomach and bowels, colic, hiccough, hysteria, and pertussis. It is chiefly employed for the same purposes as the oil of fleabane. The dose is from five to twenty drops on sugar, or in emulsion. When triturated with the extract of stramonium, oil of fireweed is said to form a valuable preparation for piles.

OLEUM ERIGERONI. *Oil of Fleabane.*

History.—This is obtained by distillation of the Leaves and Flowers of Fleabane with Water. When first obtained it is said to be of a light yellow color, and transparent. The specimen which I have before me is about six years old, it is quite fluid, of a wine-red color, clear, with a peculiar, rather pleasant, aromatic, mint-like odor, and an aromatic, bitterish, not very agreeable, penetrating taste; both the odor and taste

recall to mind those of oil of spearmint, combined with oil of amber. The only change I have noticed in the oil in my possession is a deposit of a reddish color, resembling currant jelly, soft, tenacious, in flat or tabular scales or crystals, and which I have not had an opportunity of analyzing. This deposit burns when brought into contact with flame, giving off a dense smoke, with an odor resembling that of cedar. The oil has not been analyzed.

Properties and Uses.—Oil of Fleabane is stimulant and carminative, with scarcely any perceptible astringency. It appears, notwithstanding, to exert a very remarkable influence on the system in hemorrhages, to check which, it is chiefly used. It is said to be of superior value in all hemorrhages, but more especially when from the uterus. Further investigations with this remedy are required, in order to know its proper therapeutical actions. The dose is from two to ten drops, dissolved in alcohol, and administered in mucilage or sweetened water. Combined with five or six parts of Castor Oil, or of Stramonium Ointment, it forms a valuable application to piles. (For further uses, see *Erigeron Canadense*, part II, page 450.)

OLEUM FENICULI. *Oil of Fennel.*

History.—Oil of Fennel is prepared from Fennel seeds, by distillation with water; it is colorless or pale-yellow, possesses the peculiar taste and odor of the seeds, is crystallizable at 50°, and has a specific gravity of 0.997 to 0.999. The seeds yield about 2.5 per cent. of volatile oil. The oil contains *Stearoptene* and *Eleoptene*, the former of which is identical in composition with that obtained from oil of anise. It consists of carbon 13 equivalents, hydrogen 8 and oxygen 2.

The oil employed in this country is imported, but is not very uniform in its character, and which is supposed by some to be owing to its being the product of different plants or species. One specimen examined by Dr. Montgomery, remained fluid at 22°.

Properties and Uses.—Oil of Fennel is principally used as a carminative, and for the purpose of correcting or concealing the unpleasantness of other medicines. The dose is from five to twenty drops.

OLEUM GAULTHERIÆ. *Oil of Wintergreen.*

History.—Oil of Wintergreen is prepared by distilling the plant with water; when first procured it is nearly colorless, but becomes more or less of a deep-yellow or red color by age. It has a peculiar and agreeable odor, and a sweetish, somewhat pungent, peculiar taste. Its specific gravity is 1.173, being the heaviest of the essential oils, and it boils at 412°. It possesses acid qualities, and has, according to Cahours, the same composition as the salicylate of methylene. Its purity may be determined by its unusual weight. The greater part of the oil used in this country, is prepared in New Jersey.

This oil is not peculiar to the *Gaultheria* alone, but has been detected in the bark of *Betula Lenta*, the root of *Polygala Paucifolia*, and the stems and roots of *Spiræa Ulmaria*, *Spiræa Lobata*, and *Gaultheria Hispidula*.

Properties and Uses.—This oil is stimulant and aromatic, and is principally employed to correct or disguise the taste of other medicines. The essence, or the oil dissolved in alcohol is stated to have been found effectual in curing intermittent fever. The dose of the oil is from five to ten or fifteen drops on sugar, or in emulsion.

OLEUM HEDEOMÆ. *Oil of Pennyroyal.*

History.—This oil is obtained from the *Pennyroyal* plant of this country, by distillation with water. It is of a light-yellow color, with the agreeable odor of the plant, and its warm, pungent taste, and has the specific gravity 0.948.

Properties and Uses.—Oil of Pennyroyal is a stimulant, carminative, antispasmodic, and emmenagogue. It has been used with benefit in cramp of the stomach, flatulent colic, nausea, amenorrhea, and to diminish the harshness of griping, as well as nauseating medicines. It is frequently employed for the purpose of occasioning abortion, but as with all agents of this sort, it is very dangerous. It is sometimes applied externally as a mild rubefacient. The dose is from two to ten drops on sugar, or in emulsion.

OLEUM JUNIPERI. *Oil of Juniper.*

History.—Oil of Juniper is procured from the bruised berries by distillation with water; it may likewise be procured from the leaves. It is nearly colorless, or pale greenish-yellow, lighter than water, being of the specific gravity 0.911, has a turpentine odor, a warm, pungent taste, and is not perfectly soluble in alcohol. The oil is imported into this country from Europe, and is, probably, a mixture of that from the berries and leaves. Like pure oil of Turpentine it consists of ten equivalents of carbon, and eight of hydrogen; but does not become solid with muriatic acid. The fraudulent addition of oil of turpentine, which frequently occurs, may be known by the specific gravity of the mixture being much less than that of the pure oil of Juniper.

Properties and Uses.—Oil of Juniper is stimulant, carminative, and diuretic, and is frequently employed to arrest chronic mucous discharges, especially from the urethra. It may also be used in cases of dropsy as a diuretic, combined with other agents. The dose is from five to fifteen or twenty drops. The peculiar flavor and diuretic property of Holland gin is owing to the presence of this oil.

Off. Prep.—Pilulæ Saponi Compositæ.

OLEUM JUNIPERI VIRGINIANA. *Oil of Cedar.*

History.—This oil is prepared by distillation of the tops and leaves of Red Cedar with Water. It is quite fluid, transparent, of a light yellow-

ish or reddish color, but becoming of a wine-red color by age, possesses the peculiar odor, with the nauseous, bitterish, warm taste peculiar to the leaves, in a concentrated degree. Upon standing, but very little deposit ensues; in a specimen before me of sixteen years' standing, and about a pint in quantity, can be observed a very slight deposit of confluent whitish granules or scales, somewhat resembling white wax.

Properties and Uses.—Internally this oil is stimulant and emmenagogue, possessing properties similar to those of the oil of savin; however, it is very seldom administered internally. It is chiefly used as a rubefacient, and forms an excellent local application in inflammatory rheumatism and other painful affections, either alone or combined with other articles to form a liniment. The dose, internally, is from two to ten drops, on sugar.

Off. Prep.—Linimentum Olei.

OLEUM LAVANDULÆ. *Oil of Lavender.*

History.—Oil of Lavender is procured from the flowers of Lavender, by distillation with Water; the commercial oil is generally prepared from the flowers and flower-stems. The dried flowers yield from 1 to 1.5 per cent. of oil. Oil of lavender is of a pale-yellow color, a pure, grateful, lavender odor, and a bitter, aromatic, camphoraceous taste. Its specific gravity varies from 0.893 to 0.948. Berzelius states that at 68° F., the commercial oil has the specific gravity 0.898, which, upon rectification, is reduced to 0.877. The oil prepared by distilling the whole herb, has the sp. gr. 0.920. It is soluble in all proportions in alcohol of 0.830, in two parts of proof spirit, and incompletely in acetic acid. Upon exposure to the air, it absorbs oxygen to the amount of about 120 volumes in four months and a half. It consists of a fluid oil or *Eleoptene*, and a solid substance or *Stearoptene*, the latter of which is isomeric with laurel-camphor.

The broad leaved variety of lavender, *Lavandula Spica*, furnishes the *Oil of Spike*, it is not so fragrant as the preceding oil, and bears some analogy to oil of turpentine. It is chiefly used in the preparation of varnishes for artists.

Properties and Uses.—Oil of Lavender possesses stimulant and carminative properties, and is sometimes administered in hysteria, nervous debility and headache. Its fragrance renders it an important article in perfumery, in which it is principally used. The dose of it is from one to five drops.

Off. Prep.—Tinctura Lavandulæ Composita.

OLEUM LIMONIS. *Oil of Lemons.*

History.—Oil of Lemon is obtained by lightly grating the fresh rind of the lemon, placing it in a fine cloth-bag, and then submitting it to pressure; the sediment is allowed to settle, and the clear oil is poured off. It may

also be procured by distillation, but being, when thus made, less fragrant, the method by expression is preferred. The oil is imported from the southern parts of Europe, as Italy, Portugal, etc.

It is of a pale-yellow color, but may be rendered colorless by distillation, has a rich lemon odor, a warm, aromatic, penetrating taste, and is very volatile. Its specific gravity is 0.8517, but is reduced to 0.847, by distillation of about three-fifths of it. In pure or anhydrous alcohol it dissolves in all proportions, and is soluble in seven or eight parts of ordinary alcohol. The pure oil is isomeric with pure oil of turpentine, consisting of ten equivalents of carbon, and eight of hydrogen, and forms by absorption of muriatic acid gas a solid substance of a crystalline character, and an oily fuming liquid of a yellow color. The solid substance is composed of one equivalent of oil, and one of acid, and is analogous to the artificial camphor formed from oil of turpentine, the latter of which has the formula $C_{20}H_{16}, HCl$, while that from the lemons is $C_{20}H_8, HCl$. When cooled to $8^{\circ} F.$, oil of lemon deposits some crystals, and when exposed to the air it absorbs oxygen.

It is frequently adulterated by alcohol, the fixed oils, or more frequently by oil of turpentine. Alcohol may be detected by the milky fluid which forms upon agitating the oil with water. The fixed oils may be known by leaving a permanent stain upon paper, which is not the case with the genuine oil. Oil of turpentine may be detected by the turpentine odor evolved when the impure oil is evaporated from heated paper. M. Biott states that the camphor formed by the oil of lemons exercises no action on polarized light, while the oil itself rotates a ray to the right. On the contrary, the camphor from oil of turpentine exercises a power similar to that possessed by the isolated oil, of rotating to the left. These molecular properties establish a difference between the two oils, and may serve to detect adulteration and fraud.

In order to remove mucilaginous and other matters existing in the oil of lemons, it is recommended by J. S. Cobb, to agitate the oil with a little boiling water, and to allow the water to remain in the bottle. A mucilaginous mixture forms on the top of the water, and acquires a certain tenacity, so that the oil may be poured off nearly to the last, without disturbing the deposit. The gradual decomposition of the oil, he supposes to be owing to the presence of these impurities, which enter during the process of expression and decantation. He recommends that the oil, as well as all other essential oils, should be kept in a cool, dark place, where no very great changes of temperature occur.

Properties and Uses.—Stimulant and aromatic. Its chief use is in perfumery, and to impart a pleasant flavor to medicines. It has been recommended in certain cases of ophthalmia, as a local application. A very agreeable drink for the summer and for febrile patients may be made of White Sugar four ounces, Oil of Lemon ten drops, triturate together, and add Citric Acid two drachms; a teaspoonful of this to a

tumbler of water forms a pleasant, refreshing draught. Tartaric acid may be substituted for the citric, if desired.

OLEUM MENTHÆ PIPERITÆ. *Oil of Peppermint.*

History.—Oil of Peppermint is obtained by distilling the herb with water; which yields from the 170th to the 300th part of the oil. When fresh it is nearly colorless, or pale greenish-yellow, but becomes darker and even reddish by age. It has the strong aromatic odor of the plant, together with its warm, pungent, camphorous taste, is of the specific gravity from 0.902 to 0.920, and is soluble in alcohol. When taken into the mouth and air admitted, a sense of coolness is produced. At 365° it boils, and at — 8° it deposits fine needle-like crystals of *Stearoptene*, which is said to have the same composition as the oil; these crystals are also deposited at ordinary temperatures, on long standing. The composition of the oil is $C_{21}H_{20}O_2$. Its adulterations with alcohol and oil of turpentine are not infrequent; the latter may be detected by its imperfect solubility in cold alcohol, its odor, and its disposition to explode when iodine is added; the former may be known by the dirty-white liquor formed by adding an equal volume of water to it. The oil is extensively manufactured in this country.

Properties and Uses.—Oil of Peppermint is a powerful diffusible stimulant, with carminative, antispasmodic, and anti-emetic properties. It is much employed to relieve flatulence, gastrodynia, nausea, spasms of the stomach and bowels, and to cover the taste of other drugs. Externally, it is occasionally employed as a rubefacient. It enters into a liniment, which at one time was a popular remedy for various painful local affections; it is composed as follows: Take of Oil of Olives, Oil of Peppermint, Oil of Turpentine, Tincture of Opium, Alcohol, Aqua Ammonia, each, one fluidounce; mix. To be applied three or four times a day. It is commonly used under the name of *Essence of Peppermint*, which is a tincture of it. The dose of the oil is five or ten drops on sugar.

Off. Prep.—Aqua Menthæ Piperitæ; Mistura Cajuputi Composita; Tinctura Olei Menthæ Piperitæ.

OLEUM MENTHÆ VIRIDIS. *Oil of Spearmint.*

History.—By distillation of Spearmint herb with water, from the 170th to the 300th part of a pale-yellow or greenish oil is obtained. It becomes red with age, has the peculiar odor and taste of the herb in a strong degree, is less agreeable than oil of peppermint, is soluble in alcohol, boils at 320°, and is of the specific gravity varying from 0.914 to 0.975. According to Kane its composition is represented by the formula $C_{35}H_{28}O$. It is extensively prepared in this country.

Properties and Uses.—Oil of Spearmint is carminative, antispasmodic, and diuretic. It is used very frequently as a substitute for the oil of

peppermint, and is more often prescribed on account of its diuretic properties. The dose of the oil is five or ten drops on sugar.

Off. Prep.—Aqua Menthæ Viridis; Pilulæ Saponi Compositæ; Pilulæ Taraxaci Compositæ; Tinctura Olei Menthæ Viridis.

OLEUM MONARDÆ. *Oil of Horsemint.*

History.—Oil of Horsemint is extensively manufactured in this country from the fresh herb, by distillation with water. It is of a reddish-yellow, or brownish color, of a strong, aromatic odor, a hot, pungent, even acrid taste, and is soluble in alcohol. It is composed of a yellowish-red fluid, *Eleoptene*, which has the odor of thyme, and passes over, when distilled with water, of a bright-yellow color—and of *Stearoptene*, which forms in large crystalline fragments, having the odor and taste of the oil, and for which the name of *Monardin* has been proposed. The oil has not been accurately analyzed.

Properties and Uses.—Oil of Horsemint is stimulant, antispasmodic, and anti-emetic, and in the form of the essence, has been much used to allay nausea and vomiting in Asiatic cholera, cholera-morbus, etc., its action in these cases being prompt and permanent. The dose of the oil is from two to five drops on sugar; of the essence, from ten to thirty drops in sweetened water. Externally, it is rubefacient and even vesicant, and has been advantageously used in low forms of fever, cholera-infantum, paralysis, rheumatic and neuralgic pains, etc. It soon causes heat, redness, and pain when locally applied, affording in many instances almost immediate relief.

OLEUM ORIGANI. *Oil of Origanum.*

History.—This oil is obtained from the *Origanum Vulgare*, by distillation of the plant with water; about from four to six parts of oil are procured from a thousand parts of the plant. It is of a yellow color, which becomes reddish by age; too much heat during the distillation will also give it a reddish color. Its odor is the same as that of the plant, and its taste hot and acrid; it boils at 354°, is soluble in alcohol, has its specific gravity varying according to several chemists, being given as 0.867, 0.909, and 0.940, and its composition is represented by $C_{50}H_{40}O$. It is imported from Europe, and is commonly adulterated with oil of turpentine. Much of the oil of origanum sold in this country is said to be the oil of thyme, which is prepared from the *Thymus Vulgaris* in the South of France.

The *Oil of Sweet Marjoram* obtained from the *Origanum Majorana* by distillation, in the proportion of from two and a half to six parts from a thousand of the plant, is of a lemon-yellow color, light and camphoraceous, and forms a deposit similar to camphor. It is seldom employed in the United States.

Properties and Uses.—Oil of Origanum is stimulant and rubefacient, and is chiefly employed in the form of liniment as an application to

various parts suffering from painful affections. As with many other essential oils, it affords relief in toothache upon being introduced into the cavity of the carious tooth, on lint or cotton. It is very seldom administered internally.

Off. Prep.—Linimentum Capsici Compositum; Linimentum Olei Compositum; Linimentum Saponis Camphoratum; Tinctura Camphoræ Composita.

OLEUM PIMENTÆ. *Oil of Pimento.*

History.—When Pimento Berries are bruised and distilled with water, they yield from one to nearly five per cent. of an oil, having the odor of the berries, and a hot, pungent taste. When recent it is colorless or yellowish, but becomes brownish-red by age. Its specific gravity is given as 1.021, but it is variable. Nitric Acid added to it, turns it red. Like the Oil of Cloves, it unites with salifiable bases, and also consists of a light oil and a heavy oil. When distilled with a solution of caustic potassa, the light oil comes over, and the heavy, which remains behind in combination with the potassa, may be obtained separately by distilling it with Sulphuric Acid. The light oil is a pure carbohydrogen; the heavy forms crystalline bodies with the alkalies; these oils are nearly similar to the light and heavy oils of cloves.

Properties and Uses.—Oil of Pimento is stimulant and aromatic, and may be used for similar purposes as other oils of like character, in doses of from three to six drops.

Off. Prep.—Aqua Pimentæ.

OLEUM ROSÆ. *Oil, or Otto of Roses.*

History.—Oil of Roses is prepared in Egypt, Persia, and other Asiatic countries, by distilling the petals of *Rosa Centifolia*, *Rosa Damascena*, *Rosa Moschata*, and some other species, with Water. It is obtained in very small quantity, not exceeding three drachms of the oil from a hundred pounds of the petals. It is a very high priced oil, and is generally imported in small vials or bottles. The manufacturing season is in March and April.

It is also said to be obtained by bruising the petals in a mill, expressing, filtering the expressed fluid, then placing it in small glass vessels, and exposing it to the sun; as the oil gradually rises to the surface, it is removed. Notwithstanding the Oil of Roses is prepared in the Eastern kingdoms, it has not been obtained to any degree in Europe or America.

Oil of Roses is at first of a greenish tint, but subsequently presents various shades of green, yellow, or red; but the color is no criterion of its quality. It has an agreeable, intense, most penetrating and diffusive odor, concretes below 80°, becomes liquid at or above 84°, and has the specific gravity, at 90°, of 0.832. It dissolves in about 150 parts of alcohol. It consists of carbon 23, hydrogen 23, and oxygen 3. Two oils enter into its composition, a Fluid Oil, *Eleoptene*, consisting of

carbon, hydrogen, and oxygen, and a Concrete Oil, *Stearoptene*, consisting only of carbon and hydrogen. By pressing the Oil of Roses between folds of blotting paper, the Eleoptene is absorbed, while the Stearoptene remains.

Owing to its high price, Oil of Roses is very subject to adulteration with the Oil of Sandal Wood, other volatile oils, fixed oils, spermaceti, etc. In those specimens adulterated with volatile oils, they may be known by not concreting at ordinary temperatures; and those to which fixed oils are added, leave a greasy stain on heated blotting paper.

Properties and Uses.—Oil of Roses is used altogether as a perfume, and is frequently added to cerates, ointments, liquors, etc., for the purpose of rendering them fragrant.

Off. Prep.—*Aquæ Rosæ.*

OLEUM ROSMARINI. Oil of Rosemary.

History.—When the fresh Leaves of Rosemary are distilled with Water, they yield from a half to one per cent. of Oil, which is colorless, of specific gravity 0.911, soluble in Alcohol of 0.830, and possesses the odor of the Plant. Its boiling point is stated by Kane, to be 365° , its specific gravity 0.897, and its combination $C_{45} H_{38} O_2$. When rectified its sp. gr. is reduced to 0.8886; and at 64° it requires forty parts of Alcohol 0.887 for solution. Exposed to the air a portion of it evaporates, and a Stearoptene, somewhat analogous to Camphor, is left, amounting to about a sixteenth of the original weight of the Oil. It is stated that by digesting the Oil with its weight, or one-half its weight of Potassa, and distilling, Camphor will be obtained. Oil of Rosemary is frequently adulterated with Oil of Turpentine; the adulteration may be detected by adding to the suspected Oil an equal volume of Alcohol, which dissolves the Oil of Rosemary, but leaves the Oil of Turpentine.

Properties and Uses.—Oil of Rosemary is stimulant and rubefacient; it is principally employed, however, in perfumery. A very pleasant *Cologne* may be made as follows: Take of Oil of Rosemary, Oil of Lemon, each, two fluidrachms; Oil of Lavender, Oil of Bergamot, of each, one fluidrachm; Oil of Cinnamon, Oil of Cloves, Oil of Roses, of each, eight minims; Alcohol one pint. Mix, agitate well, and after allowing the mixture to stand for a few days, with frequent agitation, filter. The dose of Oil of Rosemary is from three to six drops.

Off. Prep.—*Linimentum Opii*; *Linimentum Saponis Camphoratum.*

OLEUM RUTÆ. Oil of Rue.

History.—The fresh Leaves and Tops of Rue, when Distilled with Water, yield about seven grains in the thousand of a yellowish, acrid, heavy-smelling Volatile Oil, having the pure, intense, penetrating odor of the Plant, of specific gravity 0.837, and boiling at 446° . It becomes gradually brown with age. Its composition is given as $C_{28} H_{28} O_3$.

Properties and Uses.—Oil of Rue is stimulant, antispasmodic, and emmenagogue. It has been used with advantage in hysteria, convulsions, pertussis, amenorrhea, and dysmenorrhea, in the dose of from two to five drops, three times a day. It is sometimes criminally used for the purpose of producing abortion, in which it is highly dangerous, having been followed by fatal consequences.

OLEUM SABINÆ. *Oil of Savin.*

History.—When the Tops and Leaves of Savin are submitted to distillation with Water, they yield a yellowish, clear Oil, having in an intense degree the peculiar odor of the Leaves, and a bitter, acrid taste. The proportions of Oil obtained, as given by authors, vary very much, being stated at from one to sixteen per cent. Its specific gravity is stated to be 0.915, and its boiling point 315. It is isomeric with Oil of Turpentine, being a pure hydro-carbon, composed of ten equivalents of Carbon, and eight of Hydrogen. Sulphuric Acid added to it, will, it is asserted, convert it into an Oil very analogous to Oil of Thyme.

Properties and Uses.—Oil of Savin is stimulant, emmenagogue, and rubefacient; and may be administered in all cases as a substitute for the plant. It has been found especially valuable in amenorrhea. Ten drops of the oil on sugar, repeated three times a day, will, it is stated, positively produce abortion in from one to three weeks; but as with all other agents of this kind, it is apt to be followed by very serious consequences. The dose of the Oil, ordinarily, is from two to five drops.

Off. Prep.—Tinctura Caulophylli Composita.

OLEUM SASSAFRAS. *Oil of Sassafras.*

History.—The Bark of the Root of Sassafras, when submitted to distillation with Water, yields from two to three per cent. of a heavy Volatile Oil, having the specific gravity 1.094. When first procured it is colorless or pale-yellow but gradually acquires a reddish tint. It has the peculiar and agreeable fragrance of Sassafras, and a hot, penetrating, aromatic taste. It is said to be composed of two Oils, one of which sinks in Water, while the other floats; but according to Berzelius, the latter is frequently nothing more than Oil of Turpentine, which has been added as an adulteration. Sassafras Oil becomes reddened by Nitric Acid, and most readily inflames when fuming Nitric Acid is added to it; Caoutchouc placed in it, is dissolved after a short time. Exposed to the air without agitation it deposits crystals of Stearoptene, which possess the odor of Sassafras, and are transparent.

Properties and Uses.—Sassafras Oil is stimulant, diuretic, carminative, alterative, and diaphoretic. It may be used for all the purposes for which the bark is recommended. It is said to be an efficacious application to wens. It is much used as a local application to rheumatic and other pains. The dose is from two to ten drops on sugar, or in emulsion.

Off. Prep.—Emplastrum Resinæ Compositum ; Linimentum Cajuputi Compositum ; Linimentum Olei ; Pilulæ Saponi Compositæ ; Tinctura Camphoræ Composita.

OLEUM SUCCINI RECTIFICATUM. *Rectified Oil of Amber*

Preparation.—Take of Oil of Amber *a pint* ; Water *six pints*. Mix them in a glass retort, and distil until four pints of the Water shall have passed with the Oil into the receiver ; then separate the Oil from the Water, and keep it in well stopped bottles.—*U. S.*

History.—The Oil of Amber, thus rectified, is sufficiently pure for practical purposes, yet it may be procured thinner, more limpid, and colorless by several successive distillations. As ordinarily found, it is of an amber, or light yellowish-brown color, with a peculiar, powerful, disagreeable odor, and a warm, acrid taste. It is soluble in eight parts of alcohol of sp. gr. 0.847 at 55°, in five parts of the sp. gr. 0.825, and in all proportions in absolute alcohol. It unites with fixed oils, and imparts its taste and odor to water, without any apparent solution. The pure oil has the specific gravity 0.758 at 75°, and boils at 186°. Exposed to the light and air, it gradually changes its color and consistence, until it finally becomes black and solid. One hundred parts of it contain 88.46 parts of carbon, and 11.54 of hydrogen.

The crude Oil of Amber is prepared as follows : Put any quantity of Powdered Amber, previously mixed with an equal weight of Sand, into a glass retort, which is to be only half filled ; then distil, by means of a sand-bath, with a gradually increasing heat, an acid liquor, an oil, and a concrete acid impregnated with oil. Separate the oil from the other matters, and keep it in well-stopped bottles.—*U. S.*

In this process, the amber becomes decomposed, and yields, beside other matters, thick, very dark-colored, empyreumatic oil, which floats upon the surface of an acid liquor in the receiver. The addition of the sand is to prevent the amber from swelling too much. The oil may be separated from the acid liquor by means of a separating funnel. When the object is to decompose all the amber for the purpose of procuring as much oil as it will yield, the process of distillation should be carried on in a tubulated iron, or earthenware retort, as one of glass cannot support the requisite heat.

Properties and Uses.—Rectified Oil of Amber is the only form in which the oil of amber should be employed for internal use. It is stimulant, diuretic, and antispasmodic ; and has been employed with benefit in amenorrhœa, hysteria, dysmenorrhœa, tetanus, epilepsy, pertussis, infantile convulsions, and various other spasmodic affections. The dose is from five to thirty drops on sugar, repeated as often as required. Applied externally it is a rubefacient, and has been efficaciously used as a liniment in palsy, chronic rheumatism, pertussis, and infantile convulsions ; in the latter affection it should be rubbed along the spine, either

alone, or combined with an equal part of laudanum and three or four parts of olive oil. *Roche's Embrocation*, for pertussis and some other spasmodic affections, is composed of oil of olive, oil of cloves each, one fluidounce, oil of amber, half a fluidounce. Mix.

Off. Prep.—Linimentum Succini Compositum.

OLEUM TANACETI. *Oil of Tansy.*

History.—Oil of Tansy is prepared by distilling the Herb with Water. It is of a greenish-yellow color, with the flavor of the plant, and deposits camphor upon standing.

Properties and Uses.—Oil of Tansy possesses the properties of the plant, but is seldom employed internally on account of its bitterness. It has been employed to produce abortion, but almost always with fatal results. Dose of the oil, from two to five drops.

OLEUM VALERIANÆ. *Oil of Valerian.*

History.—When the root of *Valeriana Officinalis* is distilled with Water, it yields rather more than one per cent. of a pale-greenish volatile oil, of the specific gravity 0.934, possessing a powerful, penetrating valerian odor, and a warm, aromatic taste; and which becomes viscid and yellow, when exposed to the air. It is a compound substance of a peculiar nature, containing a carbohydrogen, equivalent in composition with pure oil of turpentine, a minute quantity of stearoptene, possessing an odor resembling that of pepper and camphor, an oxygenated oil called *Valerol*, ($C_{20}H_{12}O$) which is changed into *valeric* or *valerianic* acid by the action of the air, and a small proportion of valerianic acid, which, however, is increased by exposure to the atmosphere.

Properties and Uses.—Oil of Valerian possesses the properties of the root in a concentrated degree, and may be substituted for it, in all cases where the root is applicable. It has been found especially useful in hysteria, chorea, restlessness, etc. An efficacious preparation for nervous, sleepless and hysterical cases is composed of: Tincture of Lupulin, Tincture of Hyoseyamus, of each, four fluidounces; Camphor, one drachm; and Oil of Valerian, twenty-two minims. Mix, and give one or two fluidrachms for a dose. The dose of the oil of valerian is four or five drops.

PILULÆ.

Pills.

Pills are a very convenient mode of administering medicines which are in any way unpleasant, which are insoluble in water, or which do not require to be given in large doses. There is, probably, no form in which medicines are more frequently administered, than that of the Pill; and to make a good Pill-mass requires considerable knowledge, tact, and judgment on the part of the operator. The points demanded to prepare

a proper pill mass, are to obtain sufficient consistency, that the particles may cohere together, and to have them firm enough to retain the globular form; their component parts should be such as to prevent any tendency to moldiness, or any absorption of moisture when exposed to the atmosphere. Medicines which are deliquescent, should not be made into pills, and efflorescent substances should first be deprived of their water of crystallization. Neither should ingredients be added together which exert a mutual reaction upon each other; though this is frequently done, perhaps, to secure the influence of the resulting formation.

Many articles admit of being made into pills at once, having sufficient consistence for that purpose, as with soft extracts, and some gum-resins; or, the addition of a little water to the former, or a few drops of alcohol to the latter, will impart to them the necessary degree of softness and plasticity, should they require it. Substances which do not admit of being made into a pill mass by themselves, must have certain inert matters added to them, called *excipients*; and such excipients only should be employed as will give the proper degree of consistence and tenacity to the mass, without interfering in any way with the action of its medicinal agents, or rendering the pills too large or hard. Excipients vary very much in their character, according to the nature of the articles to be made into pill form; the most common are, syrup, mucilage, soap, bread-crumbs, conserve of roses, water, spirit, gum, sugar, magnesia, starch, molasses, etc. The dry, inert powders of starch, bread-crumbs, flour, gum arabic, etc., are incorporated with soft or liquid substances as extracts, confections, soap, oils, syrup, molasses, honey, mucilage, etc. The softer articles are combined with hard, dry, or not readily soluble agents; and among these molasses, and conserve of roses are the most esteemed, especially when the pills are to be kept for any length of time. The addition of too much gum arabic, or tragacanth to the pill mass, is objectionable, as it often causes the pill to become so hard as to have its operation materially modified, or perhaps, causing it to pass through the intestines without being dissolved. Whenever the excipient is named by the physician in his prescription, the apothecary should adopt it if practicable; but, if it be not practicable, then he must follow his own judgment. Indeed, it would always be better in prescribing extemporaneous preparations of pills, if the physician would omit the excipient, and leave it to the more practical knowledge of the apothecary to supply.

The best excipients for dry powders, as jalap, rhubarb, ipecacuanha, ginger, digitalis, conium, etc., are molasses or conserve of roses; those for resinous extracts, resins, and gum-resins, are soap, proof-spirit, alkaline solutions, and sometimes mucilage; and those for the volatile oils and oleo-resins, are soap, magnesia, white wax, etc. The proper selection of these, however, depends entirely upon the peculiar nature of the medicines ordered, and requires a considerable degree of practical knowledge, not expected to be possessed by the practicing physician.

The medicinal ingredients of the pill should be accurately mixed together, and then the excipient, in most cases, must be added, and the whole beat in a mortar, till a mass of perfect uniformity and plasticity is formed; care being taken that the pills are not made so hard as to resist the solvent power of the fluids of the stomach. The mass, having been properly prepared, is rolled into cylinders of precisely the same thickness throughout, and of a length depending upon the number of pills to be made, and is then divided, as equally as possible, into the requisite quantity of pills. This is sometimes done by means of a spatula, the spherical form being given by rolling the pills between the fingers; but most apothecaries are furnished with pill-machines, which serve to expedite the process, as well as to secure a greater degree of accuracy. A new pill-machine has been lately patented by a Mr. Lewis, which is said to be superior to any other yet used. "It consists of two metallic cylinders or rollers, having on their surface a series of hemispherical indentations or cups, corresponding in shape and size to half a pill, so that when the rollers are brought into contact side by side, and a rotary motion given them, the hemispheres in each fall immediately and accurately opposite each other, forming a series of spherical molds, in which, during the process, the pills are cast. The arrangement for working the rollers consists of two uprights, in and between which they are fixed side by side so as to revolve on their axes. Motion is communicated by means of a handle attached to a small pinion, fitting a cog-wheel at the side of one of the rollers, at the other side of which is another cog-wheel fitting a corresponding one on the other roller; these being accurately adjusted cause each other to revolve with equal speed so as always to bring the hemispheres opposite each other. The pill mass is introduced, by means of a small hopper, between the two rollers while in motion, and as from their being in close contact it cannot pass through, it is pressed into the hemispheres, and the pills are thus formed, which are collected from the outer sides of the rollers as they continue to revolve. Thus far the simple plan of making or casting pills by means of a rotatory machine, with minor modifications, has been before attempted, but as frequently abandoned from the pills remaining firmly imbedded in the hemispheres of one or other of the rollers, and the want of contrivance to deliver them freely, without the necessity for detaching them with the hand. That difficulty, in the present machine, is entirely overcome, and this achievement is its principal claim to originality and practical utility. The arrangement by which this long-sought desideratum is accomplished, consists of a movable bolt or pin at the bottom of each hemisphere, which, acted upon by springs at the interior of the rollers, forces out the pills, and detaches them effectually from the mold in which they have been cast. The only point of adhesion is now the end of the pin, from which they generally fall by their own inert gravity; but to prevent the possibility of their being drawn back again into the hemi-

spheres by the return of the pins to their original position, they are gently lifted off by being carried between the teeth of a sort of rake pressing against the outside of the rollers. Some of the pills thus formed have a slight rim round them, giving them the appearance of a seed or berry, but in every other respect they are perfect; they may, therefore, be left in their original state, or subjected to the usual process of mulling. From this machine, which had only two bands or tiers of hemispheres round the rollers, about 150 pills might be turned out in a minute, or 9000 in an hour, working it very slowly. There would be no difficulty in doubling the speed of working, and the rapidity of making might be multiplied by increasing the number of molds or hemispheres on the rollers." Several years ago, I saw a pattern machine upon a somewhat similar principle, but much more simple and perfect in its arrangement and action, the invention of Mr. Semple of this city, which would turn out about six hundred pills in a minute; and it is to be regretted that he has been so much occupied since, as to lay aside his valuable invention.

In order to prevent the pills from adhering to each other, or to the sides of the vessels in which they are kept, it is usual to agitate them in some dry powder, which gives them an external covering, as well as conceals their taste. For this purpose, powdered elm bark, powdered liquorice root, carbonate of magnesia, and starch are employed; starch is almost too light, carbonate of magnesia may be incompatible with one or more of the ingredients of the pills, and the liquorice root, or elm bark, will, as a general rule, be found the best. In Europe the powder of *Lycopodium* is much employed; and in former times it was customary to coat the pills with silver or gold leaf.

It has recently been proposed by M. Garot to cover pills with gelatin, which answers the purpose of concealing their taste, without interfering with their solubility in the stomach. He dips each pill, sustained on the point of a pin, into melted gelatin, withdraws it with a rotary motion, then fixes the pin in a paste so as to allow the coating to dry in the air, and having prepared about fifty pills in this way, proceeds to complete the operation by holding the pin in the flame of a taper so as to melt the gelatin near its point, and then withdrawing it from the pill so as to close up the orifice. The purest glue should be selected for this purpose, melted with the addition of two or three drachms of water to an ounce of the glue, and kept in the liquid state by means of a salt-bath. A coating of collodion has also been recommended, but this is improper, as the collodion will not readily dissolve in the stomach; also a mixture of equal parts of gum-arabic, sugar and starch, in powder; the pills to be dipped in a thin syrup, and then rolled in the mixture.

This process is most applicable to disagreeably odorous substances, as castor, assafetida, valerian, etc., which are completely masked by it. When the gelatin is previously colored with carmine, the pills resemble hawthorn berries.

M. Calloud treats of the subject of enveloping medicinal substances in a covering to prevent unpleasant taste, in *Journal de Pharmacie* XXIII, 301. After having tried gum, starch and sugar without satisfaction, owing to the hygroscopic tendency of the sugar and gum in moist air or with a moist mass, and their tendency to crack when very dry, he had recourse to the dried mucilage of flaxseed prepared with sugar, with success. His method is,—take of flaxseed one part, white sugar three parts, spring-water a sufficient quantity. A thick mucilage is obtained by carefully boiling the seeds, the sugar is added, and the whole of the moisture evaporated by careful desiccation. This mixture is but very slightly hygroscopic, may be reduced to fine powder, and employed for covering pills. This operation is effected extemporaneously with great facility. The pills slightly moistened, are rolled in the mucilaginous powder, by which they are coated with a layer of the compound. He has used this chiefly for carbonate of iron pills, but it may be applied to other kinds.

M. Calloud suggests another process applicable in certain cases, which is the use of butter of cacao as a covering for pills, where owing to gastric irritation, the unmasked pills will cause disagreeable symptoms. The process is very simple; the prepared pills are thrown into melted butter of cacao, then removed with a perforated skimmer, and finally rolled in finely powdered sugar, or what is better, sugar of milk.

Pills are much better preserved in small glass bottles, than in the common wood or pasteboard boxes.

PILULÆ ACONITI COMPOSITÆ. *Compound Pills of Aconite.*

Preparation.—Take of Extract of Aconite *half a drachm*; Extract of Stramonium *four grains*; Valerianate of Quinia *one scruple*. Mix thoroughly together, form a pill mass, and divide into sixty pills.

Properties and Uses.—These pills are very efficacious in febrile and inflammatory complaints, where nervous irritability, restlessness, or wakefulness is present, also in nervous headache, and other nervous affections. The dose is one pill every two, three, or four hours according to the urgency of the symptoms, and the effect caused by the use of the pills.—*J. K.*

PILULÆ ALOËS COMPOSITÆ. *Compound Pills of Aloes. Anti-Dyspeptic Pills.*

Preparation.—Take of Extracts of Boneset, Mandrake, and Ginseng, each, *two ounces*; Aloes, in powder, *eight ounces*; Gamboge, Castile Soap, of each, in powder, *four ounces*; Capsicum and Lobelia Seed, of each, *an ounce*; Oil of Cloves *twenty minims*. Mix the extracts together, then add the powders, beat and work the mass well together, and finally, add the Oil of Cloves. Divide the mass into pills of four grains each.—*T. V. M.*

This pill is, by many, considered superior to the one originally given, of which the following is the formula: Take of Socotrine Aloes, in powder, *four ounces*; Castile Soap, Colocynth, Gamboge, of each, *two ounces*; Extract of Gentian *four ounces*; Oil of Cloves *two drachms*. Mix as above. Dose same as above.

Properties and Uses.—This pill is cathartic in doses of from two to four pills. It has been found very useful in dyspepsia, constipation, jaundice, amenorrhea, and in all ordinary cases where cathartics are required.

PILULÆ ASSAFETIDÆ COMPOSITÆ. *Compound Pills of Assafetida.*

Preparation.—Take of Assafetida, Opium, Carbonate of Ammonia, each, *one drachm*. Mix the Assafetida and Opium together by means of a gentle heat, and while soft add the Ammonia. Divide the mass into seventy-five pills.

Properties and Uses.—This pill is useful in many nervous and hysterical cases. Each pill contains four-fifths of a grain of opium. The dose is one or two pills, according to the severity of the case.

PILULÆ BAPTISLÆ COMPOSITÆ. *Compound Pills of Wild Indigo.*

Preparation.—Take of Leptandrin *four grains*; Podophyllin *eight grains*; Sanguinarin *one grain*; Hydro-alcoholic Extract of Wild Indigo Root, *a sufficient quantity* to form a pill mass. Mix thoroughly together, and divide into sixteen pills.

Properties and Uses.—These pills are cholagogue, laxative, and anti-septic; they are especially useful in typhoid fevers, and in all typhoid conditions, where it is required to keep the bowels regular. The dose is one pill, to be repeated every two, three, or four hours until a mild operation is produced; to be given daily or every other day.—*J. K.*

PILULÆ CAMBOGIÆ COMPOSITÆ. *Compound Pills of Gamboge.*

Preparation.—Take of Gamboge and Scammony, each, in powder, *twelve grains*; Elaterium *two grains*; Croton Oil *eight minims*; Extract of Hyoscyamus *a sufficient quantity*. Mix together, and divide into twelve pills.

Properties and Uses.—This is a quick and certain cathartic, useful in dropsy, obstinate constipation, etc. The dose is one pill, repeated every hour or two, till it operates. It is contra-indicated when inflammation of any of the abdominal viscera is present.

PILULÆ CAMPHORÆ COMPOSITÆ. *Compound Pills of Camphor. Cholera Pills.*

Preparation.—Take of Camphor, Opium, Kino, of each, in powder, *thirty grains*; Capsicum *five grains*; Conserve of Roses *a sufficient quantity*. Mix together and form a pill mass, and divide into thirty pills.

Properties and Uses.—These pills were much employed in Asiatic cholera, as a stimulant, antispasmodic, anodyne, and astringent, and

with much success. One pill to be given after each discharge from the bowels, or oftener, if the urgency of the case require it. Where powders are preferred, the conserve of roses may be omitted, and the mixture be given in powder.—*R. S. N.*

PILULÆ CIMICIFUGÆ COMPOSITÆ. *Compound Pills of Black Cohosh.*

Preparation.—Take of the Hydro-alcoholic Extracts of Black Cohosh, and Scullcap, each, *one drachm*; Valerianate of Quinia *half a drachm*. Mix thoroughly together, form into a pill mass, and divide into sixty pills.

Properties and Uses.—These pills will be found very useful in chorea, and other derangements of the nervous system; also in fevers or other diseases, attended with much restlessness or wakefulness, and in several uterine affections. The dose is one pill every one, two, or three hours, daily, according to the urgency of the symptoms.—*J. K.*

PILULÆ COPAIBÆ. *Pills of Copaiba.*

Preparation.—Take of Copaiba and White Wax, of each, *one drachm*. Melt the Wax, mix in the Copaiba, and divide into thirty pills.

These pills are frequently combined in other proportions, and with the addition of Cubebs. Thus: take of Copaiba *one part*; White Wax *one part and a half*; Cubebs, in powder, *two parts*. Melt the Wax, add the Copaiba and Cubebs, and divide into four-grain pills. This combination is suitable to warm climates. Another combination is: take of Copaiba *one part*; White Wax *two parts*; Cubebs, in powder, *three parts*. Prepare as above, and divide into four-grain pills.

Properties and Uses.—These pills are useful in gonorrhea, and other affections where the medicinal agents are indicated. The dose is two to four pills, three times a day.

Copaiba is usually solidified into a pill mass by the use of magnesia. The magnesia combines with the hard resin or copaibic acid, and absorbs the volatile oil, in consequence of which the copaiba gradually loses its fluidity, becoming at first a soft, tenacious mass, and finally dry, hard, and brittle. The proportion of magnesia required to solidify the copaiba, depends entirely upon its proportions of volatile oil and hard resin. Ordinarily, about one-sixteenth part of magnesia will be found to solidify the copaiba of the shops in six or eight hours. One advantage in this preparation is, that the copaiba is made into a pilular condition, with but little increase of its bulk. Care should be taken to divide the mass into pills before it becomes too hard, and that the magnesia employed has not become hydrated by exposure to a moist air or otherwise.

M. Thierry states that if one part of freshly prepared hydrate of lime be mixed in a marble mortar with fifteen parts of copaiba, the mixture then transferred to an open vessel, placed upon a sand-bath, and the heat be kept up for four hours, occasionally stirring, it will produce the same effect as magnesia. About a twenty-fourth of the weight of the mixture is lost, which is chiefly the water of the hydrate.

PILULÆ COPAIBÆ COMPOSITÆ. *Compound Pills of Copaiba.*

Preparation.—Take of Solidified Copaiba *one drachm*; Ethereal Extract of Cubebs *half a drachm*; Podophyllin *nine grains*; Gum Myrrh *one drachm*; Alcoholic Extract of Nux Vomica *fifteen grains*. Mix thoroughly together, and divide into three-grain pills.

Properties and Uses.—These pills are useful in gonorrhea, gleet, stricture, and chronic inflammation of the prostate. The dose is from two to four pills, twice a day. For ordinary cases, the following preparation will be found beneficial: Take of Solidified Copaiba *two drachms*; Ethereal Extract of Cubebs *one drachm*; Oil of Juniper *a sufficient quantity*, not to impair the pilular consistency of the mass. Mix, and divide into pills of four grains each. The dose is the same as above.

PILULÆ EUPURPURINI COMPOSITÆ. *Compound Pills of Eupurpurin.*

Preparation.—Take of Eupurpurin *two scruples*; Xanthoxylin *one scruple*; Strychnia *one grain*. Mix thoroughly together, and divide into twenty pills.

Properties and Uses.—This forms a stimulating diuretic, and will be found useful in suppression of urine, torpor or paralysis of the kidneys or bladder, rheumatism, hepatic torpor, derangements of the digestive functions, etc. The dose is one pill, to be repeated three or four times a day.—*J. K.*

PILULÆ FERRI CARBONATIS. *Pills of Carbonate of Iron. Vallet's Ferruginous Pills.*

Preparation.—Take of Sulphate of Iron *eight ounces*; Carbonate of Soda *ten ounces*; Clarified Honey *three ounces*; Sugar, in powder, *two ounces*; Boiling Water *two pints*; Syrup *a sufficient quantity*. Dissolve the Sulphate of Iron, and Carbonate of Soda, each separately, in a pint of the Water, having previously added a fluidounce of Syrup to each pint; then mix the two solutions when cold, in a bottle just large enough to hold them, close it accurately with a stopper, and set it by, that the Carbonate of Iron may subside. Pour off the supernatant liquid, and having washed the precipitate with Warm Water sweetened with Syrup, in the proportion of a fluidounce of the latter to a pint of the former, until the washings no longer have a saline taste, place it upon a flannel cloth, to drain, and express as much of the Water as possible; then immediately mix the precipitate with the Honey and Sugar, and by means of a water-bath evaporate the mixture, constantly stirring, until it is so far concentrated as to have a pilular consistence on cooling.—*U. S.*

History.—In the above preparation, the carbonate of iron, which by the ordinary processes, absorbs oxygen and loses a great proportion of its carbonic acid while washing and drying, is, by the saccharine matter employed throughout the operation, almost completely prevented from such injurious change. And to preserve the ferruginous preparation

unaltered for medicinal use, it is evaporated to a pilular consistence, with the addition of Honey and Sugar, as related in the formula. If the sulphate of iron used should be impure, a portion of sesquioxide will certainly be present.

When properly prepared, this is in a soft mass, of pilular consistence, black throughout, of a strong, chalybeate taste, and wholly and readily soluble in acids.

Properties and Uses.—This pill is a ferruginous tonic, and may be employed in all cases where iron is indicated. It is especially useful in chlorosis, amenorrhea, and other female complaints; by its use the coloring matter of the blood seems to be increased, and the capillary system rendered more active. It may be divided into pills varying from three to five grains each, of which from three to six may be given per day, and continued for several weeks, particularly if an improvement of the health takes place.

PILULÆ FERRI COMPOSITÆ. *Compound Pills of Iron. Emmenagogue Pills.*

Preparation.—Take of Subcarbonate of Iron *one drachm*; Podophyllin *fifteen grains*; White Turpentine *half a drachm*. Mix well together, and divide into thirty pills.

Properties and Uses.—This pill is used chiefly as an emmenagogue. The dose is one pill every three or four hours.

PILULÆ FERRI FERROCYANURETI COMPOSITÆ. *Compound Pills of Ferrocyanuret of Iron.*

Preparation.—Take of Ferrocyanuret of Iron, Sulphate of Quinia, and Hydro-alcoholic Extract of Black Cohosh, each, *two scruples*. Mix, and divide into forty pills.

Properties and Uses.—These pills are tonic, alterative, and antiperiodic, and may be used in all diseases attended with periodicity, as intermittent fever, chorea, epilepsy, etc. They will be found an excellent remedial agent. The dose is one pill, three or four times a day, or oftener if required.—*J. K.*

PILULÆ FERRI IODIDI. *Pills of Iodide of Iron.*

Preparation.—Take of Sulphate of Iron *a drachm*; Iodide of Potassium *four scruples*; Tragacanth, in powder, *ten grains*; Sugar, in powder, *half a drachm*. Beat the articles with Syrup so as to form a mass, to be divided into forty pills.—*U. S.*

History.—By the above process, a double decomposition takes place; the sulphuric acid of the crystallized sulphate of protoxide of iron combines with the potassium to form sulphate of potassa, while at the same time the iodine forms with the iron an iodide of iron. Consequently the pill will contain sulphate of potassa; and also a portion of iodide of potassium, this salt being added in a greater quantity than is required

to decompose all the sulphate of iron. The sulphate and iodide are to be first rubbed together, and when accurately mixed, the sugar and tragacanth must be added, and then the syrup. By the addition of the sugar, the iodide of iron is protected from oxidation.

This pill should never be kept or made, except for immediate use. It is not very tenacious in its character, and at first evolves iodine; it has a styptic, rather acrid taste, but is not so unpleasant as the Solution of Iodide of Iron. The presence of sulphate of potassa and iodide of potassium renders it complex and objectionable.

Properties and Uses.—This pill has the same therapeutical applications as the solution of iodide of iron. Each pill contains a little more than a grain and a half of iodide of iron; one of which may be given for a dose, and repeated two or three times a day.

In consequence of the intensely styptic taste of the solution of iodide of iron, as well as the disagreeable stain it imparts to the teeth and lips, a serious inconvenience has arisen in its administration, and many modes have been devised to divest it of these objections, as well as of its tendency to change. Perhaps the best mode of preparing it, is the following: Take of pure Iodine, Iron reduced by Hydrogen, each, *half a drachm*; Honey, *a sufficient quantity* to give the consistency of thick molasses. Triturate the Iodine as finely as possible, then add the Iron and Honey, and continue the trituration until the articles are thoroughly mixed together, and fumes of iodine cease to be disengaged, the mixture assuming a greenish tinge. Then rub in finely powdered Extract of Liquorice, *a sufficient quantity* to make the mass. After the pills have been made, for still further protection from atmospheric influence, they may be dipped once or twice in an ethereal solution of Balsam of Tolu.

PILULÆ HYOSCYAMI COMPOSITÆ. *Compound Pills of Hyoscyamus.*

Preparation.—Take of Extract of Hyoscyamus, Extract of Valerian, each, *two drachms*; Extract of Aconite, Sulphate of Quinia, of each, *one drachm*. Mix thoroughly together, and divide into pills of three grains each.

Properties and Uses.—These pills will be found advantageous in neuralgia, rheumatism, chorea, dysmenorrhea, and many affections of a similar character. The dose is one pill every two, three, or four hours, according to circumstances. As the virtue of Valerian resides in its oil, it is probable the extract is nearly useless; and one-half the quantity of the Oil of Valerian, or Valerianic Acid, could be substituted for the extract, and form a much more efficacious pill.—J. K.

PILULÆ LEONURI COMPOSITÆ. *Compound Pills of Motherwort.*

Preparation.—Take of the Hydro-alcoholic Extracts of Motherwort, and Unicorn Root, each, *two drachms*; Leptandrin, Cimicifugin, of each, *one drachm*. Mix thoroughly together, form a pill mass, and divide into sixty pills.

Properties and Uses.—These pills are useful in many uterine affections, acting as a uterine tonic and alterative. One pill may be given every one, two, or four hours, according to the urgency of the case.—*J. K.*

PILULÆ LEPTANDRINI COMPOSITÆ. *Compound Pills of Leptandrin.*

Preparation.—Take of Leptandrin *one drachm*; Podophyllin *half a drachm*; Extract of Rhubarb *a sufficient quantity*. Mix together, and divide into sixty pills. Some prefer making these pills with Extract of Dandelion, instead of Rhubarb.

Properties and Uses.—This is a valuable cholagogue pill, very beneficial in liver affections, obstinate constipation, or wherever catharsis is required. It will likewise be found useful in dysentery. The dose is from one to three pills, once or twice a day.

PILULÆ PHYTOLACCÆ COMPOSITÆ. *Compound Pills of Poke.*

Preparation.—Take of Extract of Poke *two drachms*; Hydro-alcoholic Extract of Stillingia *one drachm*; Extract of Stramonium *eight grains*. Mix thoroughly together, form into a pill mass, and divide into sixty-four pills.

Properties and Uses.—These pills will be found of value in osteocopus, or pains in the bones of a mercurial or syphilitic character, and are also beneficial in rheumatism, syphilis, and scrofula. The dose is one pill every two, three, or four hours, as the urgency of the case may require. The fluid Extract of Stillingia, may be substituted for the Hydro-alcoholic Extract, and pulverized Poke-root added as an excipient.—*J. K.*

PILULÆ PODOPHYLLINI COMPOSITÆ. *Compound Pills of Podophyllin.*

Preparation.—Take of Podophyllin, Scammony, Gamboge, each, in powder, *one drachm*; Castile Soap *half a drachm*. Triturate the powders thoroughly together for about half an hour, then add the Soap; mix and beat the whole together till they are thoroughly incorporated. Divide the mass into one hundred and twenty pills.

Properties and Uses.—This is a most valuable pill for all diseases where cathartics are required, and has cured many cases of hepatic affections by a continued use of them. The dose is one or two pills, every night. They have no tendency toward producing constipation, but rather the reverse, and after using them for several days in succession, they will generally be found so active that it will be necessary to omit them for a number of days, before resuming their administration. They may be safely used in all ordinary cases where purgation is desired; they operate freely and thoroughly, and usually without causing nausea, griping, or debility.

In consequence of the difficulty with which pure Scammony is obtained in this country, many practitioners substitute for it, in these pills, Apocynin, or Extract of Rhubarb, or Iridin, either of which,

will, probably, be found preferable to an impure or counterfeit scammony.—*J. K.*

PILULÆ POLYGONI COMPOSITÆ. Compound Pills of Water Pepper.

Preparation.—Take of Dried Sulphate of Iron, and Cimicifugin, each, *one drachm*; Iridin *fifteen grains*; Extract of Water-Pepper *a sufficient quantity*. Mix well together, and divide into sixty pills.

Properties and Uses.—These pills are emmenagogue, and exert an especial influence on the female organs of generation. They have been used with advantage in chlorosis, amenorrhea, dysmenorrhea, uterine leucorrhea, etc. The dose is one pill every two or three hours.—*J. K.*

PILULÆ PTELEINI COMPOSITÆ. Compound Pills of Ptelein.

Preparation.—Take of Hydrastin, Cimicifugin, Ptelein, Aletridin, of each, *half a drachm*; Alcoholic Extract of Nux Vomica *four grains*. Mix the articles thoroughly together, and divide into sixty pills.

Properties and Uses.—These pills are very efficacious in dyspepsia, attended with distress after eating, flatulency, etc. They act upon the mucous coat of the stomach, gradually restoring it to a normal condition. I have employed them considerably, and prefer them to any other remedy which I have ever used. If constipation be present, it must be removed by rhubarb and potassa, podophyllin, or other proper agents. The dose is one pill three times a day, to be taken about an hour after each meal, with the proper attention to diet and regimen.—*J. K.*

PILULÆ QUINIÆ SULPHATIS. Pills of Sulphate of Quinia.

Preparation.—Take of Sulphate of Quinia *one drachm*; Aromatic Sulphuric Acid *forty-five drops*. Drop the Acid into the Quinia on a tile or slab, and triturate with a spatula until it assumes a pilular consistence; then divide into sixty pills.

History.—This method of forming Quinia into a pill mass was made known by Mr. E. Parrish. The ingredients when mixed form a fluid, which soon thickens into a paste, and finally becomes quite solid, and so adhesive as to be readily divided and rolled into pills; care must be taken not to allow the mass to become too dry and brittle before dividing it, as it is liable to do if allowed to remain too long. In this form a portion of the disulphate being converted into the soluble neutral sulphate, the preparation more nearly resembles the solutions in composition, and is believed to be more certain and rapid in its action. When it is desired to incorporate other substances in powder with the Quinia thus prepared, as Prussiate of Iron, etc., they should be added to the mass when it is just so soft that, upon their addition, it will immediately assume the proper consistence. It is not, however, advisable to employ this process when any considerable quantity of other ingredients are prescribed with the quinia, unless a little syrup or honey is also added to prevent the too rapid hardening and consequent crumbling of the mass.

Properties and Uses.—For the uses of these pills, see Sulphate of Quinia. Each pill contains a grain of sulphate of quinia, and twelve are equivalent to an ounce of good Peruvian Bark. The above pill mass, may be made into five-grain pills if desired, which will not be found inconveniently large.

PILULÆ QUININÆ COMPOSITÆ. *Compound Pills of Quinia.*

Preparation.—Take of Sulphate of Quinia, Cornine, and Tartaric Acid, each, in powder, *one drachm*; Hydro-alcoholic Extract of Black Cohosh a *sufficient quantity*. Mix together, and divide into four-grain pills.

Properties and Uses.—These pills are tonic and antiperiodic, and may be employed in intermittent and remittent fevers, and in all diseases attended with symptoms of periodicity. The addition of the tartaric acid renders the quinia more readily soluble in the juices of the stomach. The dose is one pill every one, two, or three hours, according to the severity or urgency of the symptoms.—*J. K.*

PILULÆ SAPONI COMPOSITÆ. *Compound Pills of Soap. Diuretic Pills.*

Preparation.—Take of Oils of Spearmint, Juniper, and Sassafras, each, *one fluidrachm*; Castile Soap *one drachm and a half*. Beat the Soap in an iron mortar, gradually adding the Oils, and when the ingredients are thoroughly incorporated, divide into eighteen pills.

Properties and Uses.—These pills are stimulant and diuretic, and are very beneficial in gravel and all chronic urinary affections. The dose is three pills three times a day, or one pill every hour through the day.—*T. V. M.*

PILULÆ TARAXACI COMPOSITÆ. *Compound Pills of Dandelion.*

Preparation.—Take of Bloodroot, in powder, *one drachm*; Podophyllin *half a scruple*; Extract of Dandelion *one drachm*; Oil of Spearmint *five minims*. Mix the Powders with the Extract, add the Oil, beat up thoroughly together, and divide into fifty pills.

Properties and Uses.—Laxative, nauseant, and diuretic. They are of much efficacy in jaundice, hepatic diseases, and affections of the kidneys. The dose is one or two pills three times a day, sufficient to produce a slight sensation of nausea. This pill is superior to the one made after the old formula.—*T. V. M.*

PILULÆ VALERIANÆ COMPOSITÆ. *Compound Pills of Valerian.*

Preparation.—Take of the Hydro-alcoholic Extract of Scullcap, and Extract of Chamomile, each, *two drachms*; Extract of Boneset, Sulphate of Quinia, of each, *one drachm*; Capsicum *one scruple*; Oil of Valerian *half a drachm*, by weight. Mix the articles together, beat them until thoroughly incorporated, and divide into ninety pills.

Properties and Uses.—These pills are tonic and nervine, and may be used in all cases where such a combination of action is desired. The dose is one pill every two or three hours.

PILULÆ VIBURNI COMPOSITÆ. *Compound Pills of High Cranberry.*

Preparation.—Take of Hydro-alcoholic Extracts of High Cranberry, Blue Cohosh, and Unicorn Root, each, *half a drachm*; Extract of Partridge Berry *one drachm*. Mix together, and divide into forty Pills.

Properties and Uses.—These pills are of superior efficacy in uterine diseases, as amenorrhea, dysmenorrhea, leucorrhea, etc.; as a uterine tonic in habitual miscarriages; and may be given during pregnancy to relieve cramps, and many other unpleasant sensations occurring at that period. The dose is one or two pills three times a day.—*J. K.*

POTASSA.

Preparations of Potassa.

POTASSA. POTASSÆ HYDRAS. *Caustic Potassa. Hydrate of Potassa.*

Preparation.—Take of Solution of Potassa *a gallon*. Evaporate the Water in a clean iron vessel over the fire, till ebullition ceases, and the Potassa melts. Pour this into suitable molds, and keep it, when cold, in well stopped bottles.—*U. S.*

History.—The Solution of Potassa used in preparing this Caustic, should be one of recent manufacture, and the evaporation should be conducted in an iron vessel, as glass or earthenware are acted on by the potassa; and in using an iron vessel, however clean it may be, a small portion of Oxide of Iron will be imparted to the caustic, but not in quantity sufficient to interfere with its medicinal applications. The contact of all organic substances should be carefully avoided. The evaporation must be completed as speedily as possible, so as to lessen the liability to absorption of carbonic acid from the atmosphere. Absorption of carbonic acid will not take place, so long as the temperature is kept at the boiling point; but if the evaporation be in any way interrupted, and the liquid allowed to cool, the potassa becomes quickly carbonated. The molds into which the fused potassa is run, should be made of iron, and having a cylindrical shape. As white flint glass is slightly acted on by the caustic alkali, it should be kept in green glass bottles with ground stoppers.

Potassa, as met with in the shops, is either in the form of fragments of plates, or in cylindrical pencils of a dingy gray or greenish color, with sometimes a bluish tint, a fibrous fracture, an intense, corrosive, alkaline taste, and an odor similar to that of slaking lime. It is exceedingly deliquescent, powerfully attracting carbonic acid from the atmosphere, and when moist feels soapy. It is readily soluble in water or alcohol, its aqueous solution having the properties of Liquor Potassa.

deliquescent = melting in solution by atmosphere

Acids combine with it, causing much heat, and forming crystallizable salts. It melts at a low-red heat, and is volatilized at a bright-red heat. It usually contains many impurities, as sesquioxide of lime, silica, sulphate of potassa, alumina, chloride and teroxide of potassium, carbonate of potassa, etc. By dissolving it in alcohol, which does not act upon these impurities, but takes up only the pure hydrated potassa, filtering and evaporating to dryness, and then fusing the dry mass obtained, a pure hydrate of potassa may be procured, white, dry, hard, brittle, and intensely caustic. This is called *Alcoholic Potassa*, and possesses properties similar to the impure article above described. When its solution is added to an excess of tartaric acid, it yields a crystalline precipitate of cream of tartar, and when added to a solution of chloride of platinum, a yellow precipitate is the result; and which actions will serve to detect it from soda and lithia. Independent of its impurities, the official potassa consists of one equivalent of dry potassa 47.2, and one of water 9=56.2. Dry potassa consists of one equivalent of potassium 39.2, and one of oxygen 8=47.2.

Properties and Uses.—Caustic Potassa is powerfully corrosive; when applied to soft animal textures, it first attracts their water, and then rapidly disorganizes them; after which extensive inflammation ensues around the part, previous to the separation of a deep slough. It has no action as a poison, except what depends directly on the local injury occasioned; no direct influence being exerted through the medium of absorption. Acids, as vinegar, lemon-juice, etc., and the fixed oils are antidotes to its injurious action, producing with it harmless salts of potassa or soapy solutions.

It is administered internally only when in solution, as an antacid, antilithic, and diuretic. Externally, it is used, in its solid state, for making caustic issues, opening abscesses, and destroying tumors, but from its extreme deliquescence, it is very apt to spread, and act on parts not desired. To obviate this the integuments around the parts to be acted on, should be protected by two or three layers of cloth, spread with adhesive plaster, and perforated with a hole in the center, of the necessary size. Then a rod of potassa, slightly moistened at the end, is to be gently rubbed over that portion of the skin embraced in the perforation of the plaster. It must be rubbed until the skin becomes discolored, when an elm, or bread-and-milk poultice must be applied. In a few days the eschar will be detached. After the slough separates, the retraction of the surrounding skin always makes the surface of the issue much larger than the circle originally cauterized, the extent of which must be regulated accordingly. In applying the caustic, wrap it with paper. We occasionally employ this caustic in the destruction of tumors, cancers, etc., and on the surface of unhealthy or malignant ulcers. A very unscientific application of a solution of this caustic, applied to the spine, has been recommended in the treatment of tetanus.

Equal parts of Caustic Potassa and Quicklime, rubbed together, and kept in well-stopped bottles, form the Vienna Caustic (*Potassa cum Calce*). It is milder than the preceding, and has been particularly recommended for cauterizing the neck of the uterus. It is also prepared in sticks. (*See Calx, Part II, page 284.*)

POTASSÆ ACETAS. *Acetate of Potassa.*

Preparation.—Take of Acetic Acid a pint; Carbonate of Potassa a sufficient quantity. Add the Carbonate of Potassa gradually to the Acetic Acid till it is saturated; then filter, and evaporate cautiously, by means of a sand-bath, until a dry salt remains. Keep this in closely-stopped bottles.—*U. S.*

History.—It was formerly the method, in preparing this salt, to neutralize distilled vinegar with carbonate of potassa, and then evaporate; but by pursuing it, a salt of a reddish or brownish color would be obtained, arising from the organic matter contained in the vinegar, and which required some trouble and dexterity in manipulation to remove. By employing acetic acid or colorless pyroligneous acid, and a pure carbonate, a salt is obtained of sufficient purity and whiteness for medical use. Care should be observed, that no excess of alkali exists, as in this case it will react on the acid during evaporation and give rise to discoloration; a slight excess of acid is not liable to such objections. The heat employed in drying the acetate of potassa should be the chloride of calcium bath on the small scale, or steam under pressure on the large scale; as that of a vapor-bath is too low for thorough desiccation and that of a sand-bath may become entirely too high.

Acetate of potassa prepared by the above process is in the form of soft fibrous masses, and when pure is white, inodorous, soapy to the touch, neutral, and of a warm, saline, pungent taste. As met with in the shops, it has a foliated texture, somewhat resembling spermaceti in appearance, on account of which, it was formerly called *Foliated Earth of Tartar*. It is extremely deliquescent when exposed to the air, becoming converted into an oily-like liquid, and should consequently be kept in well-stopped bottles. Heat fuses it, and if continued or increased, decomposes it, converting the acetic acid into acetone and carbonic acid, leaving the carbonate of potassa remaining. Acetate of Potassa is soluble in half its weight of temperate water, and twice its weight of alcohol. The salt exists in the juices of many plants, and is the chief source of the carbonate of potassa existing in wood-ashes. It is *incompatible* with the mineral acids, sulphates of soda, and magnesia, corrosive sublimate, nitrate of silver, and several other earthy and metallic salts. It is composed of one equivalent of acid 21, one of base 47.2, and two of water 18=116.2, ($\bar{A} + KO + 2 Aq.$)

As now prepared, Acetate of Potassa is but little liable to adulteration; but when impurities are present the principal ones are sulphate of

potassa, tartrate of potassa, chloride of potassium, and the salts of lead and copper. The salts of copper may be detected by ferrocyanuret of potassium which gives a brown precipitate; those of lead by sulphureted hydrogen which occasions a blackish precipitate. Chloride of potassium may be distinguished by adding nitrate of silver to a dilute solution; if it be added to a concentrated solution, soluble crystals of acetate of silver will be formed. Tartrate of potassa will remain undissolved, when the salt is placed in alcohol; and the sulphate of potassa may be ascertained by the chloride of barium.

Properties and Uses.—Acetate of Potassa in doses of from a scruple to a drachm, acts as a diuretic, and has been used with good effect in dropsy, uric acid diathesis, and in other cases where diuresis is indicated. It has likewise been found beneficial in several cutaneous diseases, as eczema, lepra, psoriasis, etc. In these cases it acts energetically as a diuretic, and effects cures in from three weeks to two months. Half a drachm of the salt dissolved in water, may be given, and repeated three times a day. In doses of two or three drachms it acts as a mild cathartic. Two drachms of the carbonate of potassa saturated with distilled vinegar, will produce a copious discharge of urine, and, in dropsical cases, ten or twelve stools. This salt was formerly called *Sal Diureticus*.

Off. Prep.—Tinctura Ferri Acetatis.

POTASSÆ BICARBONAS. *Bicarbonate of Potassa.*

Preparation.—Take of Carbonate of Potassa *four pounds*; Distilled Water *ten pints*. Dissolve the Carbonate of Potassa in the Water and pass Carbonic Acid through the solution till it is fully saturated. Then filter, and evaporate the filtered liquor that crystals may form, taking care that the heat does not exceed 160°. Pour off the supernatant liquid, and dry the crystals upon bibulous paper. Carbonic Acid is obtained from marble by the addition of dilute sulphuric acid.—*U. S.*

History.—By this process, the carbonate of potassa containing one equivalent of acid and one of base, becomes combined with an additional equivalent of carbonic acid. The salt used should always be pure, or else there will be siliceous impurities present, to separate which, is the reason for the filtration ordered in the above formula.

Bicarbonate of Potassa may be made by several other processes, among which may be mentioned the forming a solution of carbonate of potassa in its own weight of water, adding about half its weight of sesquicarbonate of ammonia, heating the solution to about 130°, and stirring occasionally, until small crystals begin to form. In this process, ammonia is evolved, and the ammoniacal carbonate is taken up by the potassa salt, and while slowly cooling, crystals of bicarbonate of potassa are formed. Christison recommends a quick, certain, and economical mode of preparing it. Sesquicarbonate of ammonia, in very fine powder, is to be thoroughly mixed with carbonate of potassa, by the aid of a very

little water, triturating briskly until a perfectly smooth, thick, uniform pulp is formed. Dry this pulp by a gentle heat, not exceeding 130° or 140° , and continue the drying until an ammoniacal odor ceases to be given off. By the drying, ammonia is evolved, and its carbonic acid combines with the carbonate of potassa, so that when the sesquicarbonate becomes wholly decomposed and all its ammonia volatilized, a pure bicarbonate of potassa is left behind, which may be reduced to a fine powder.

A common mode of preparing Bicarbonate of Potassa, among manufacturers, is to suspend a solution of the pure carbonate, within a cask, over a liquid undergoing the vinous fermentation, and allow it to remain there for six or seven weeks; the carbonic acid evolved is absorbed by the carbonate of potassa, and a bicarbonate is formed. Distillers and brewers often prepare it in this manner—and the *Sal aëratum* of commerce, which is between a carbonate and a bicarbonate in its composition, is made in this way.

Bicarbonate of Potassa crystallizes in colorless, transparent, right-rhombic prisms, usually truncated on the acute edges; their primitive form is the rectangular octaëdre. It is inodorous, slightly alkaline to the taste, permanent in the air, soluble in four parts of cold water, but insoluble in boiling water without decomposition, carbonic acid being liberated and a sesquicarbonate of potassa formed; it is also insoluble in alcohol. At a red-heat it loses about 30.7 per cent., or all its water of crystallization, and half its carbonic acid, and is converted into a very pure carbonate. It has no power of dissolving or disorganizing the animal textures. It consists of two equivalents of acid 44, one of base 47.2, and one of water $9=100.2$, ($2\text{ CO}_2+\text{KO}+\text{Aq.}$).

Bicarbonate of Potassa is subject to adulterations of the sulphate or muriate of potassa, from having employed an impure carbonate in its preparation; and of carbonate of potassa from some defect in the process of making it. The sulphate and muriate of potassa may be detected by chloride of barium or nitrate of silver causing a white precipitate in its solution supersaturated by nitric acid. Carbonate of potassa may be known by adding a solution of corrosive sublimate, which will cause a brick-red precipitate, if even the hundredth part of the carbonate be present; a solution of the pure bicarbonate in forty parts of water has no effect, or at most, produces merely a white haze. The carbonate may also be detected by adding starch sugar to a heated solution of the bicarbonate under examination; if the impurity be present, the solution becomes changed to yellow or brown.

Properties and Uses.—Bicarbonate of Potassa is antacid, antilithic, and diuretic, is less irritating and unpleasant than the carbonate, and may be used in larger doses. It is preferred as a general rule to the Carbonate, for which it may in nearly all cases be used as a substitute. Dose, ten

to twenty grains as an antacid and antilithic; one to two drachms, as a diuretic.

Off. Prep.—Extractum Rhei et Potassæ Fluidum; Pulvis Rhei Compositus; Syrupus Rhei et Potassæ.

POTASSÆ BICHROMAS. *Bichromate of Potassa.*

Preparation.—Take of the neutral or yellow Chromate of Potassa *any quantity*; Water *a sufficient quantity*. Dissolve the Chromate in the Water, filter, warm the filtered solution, and while warm acidulate the solution with sulphuric acid; then set the mixture aside for two or three days, when beautiful orange-red crystals of bichromate of potassa will be formed.

History.—The addition of sulphuric acid to the filtered solution, as above explained, separates one equivalent of potassa from two of the neutral chromate, thus converting the salt into a bichromate. The yellow chromate, from which is prepared the bichromate, may be obtained by igniting four parts of powdered chrome-iron ore, with one part of nitre, and lixiviating the resulting mass with water. The solution when evaporated, yields the chromate in crystals. By this process, oxygen is furnished by the nitric acid of the nitre, and the sesquioxide of chromium is converted into chromic acid, which then combines with the potassa of the same salt; the iron likewise becomes sesquioxidized and insoluble.

Bichromate of Potassa is in anhydrous, prismatic crystals, of an orange-red color, having a cooling, bitter taste, insoluble in alcohol, and soluble in ten parts of cold and much less boiling water. It fuses at a red-heat without decomposition, forming a red liquid, which on cooling congeals into a crystalline mass and then falls to powder. It is manufactured largely for the use of calico printers, and those engaged in making it are subject to painful ulcerations of the hands. Paper impregnated with its solution, and dried, forms excellent tinder. It is composed of two equivalents of chromic acid 104.06, and one of potassa 47.2=151.26; its formula is $\text{KO}, 2 \text{Cr}, \text{O}$.

Properties and Uses.—Bichromate of Potassa is an irritant and caustic, its only therapeutical use is as an external application; when brought in contact with the skin, its solutions cause very painful sores, which are difficult to heal. A saturated solution of it has been recommended as an application to warts, excrescences, hemorrhoidal tumors, scirrhus tumors, tuberculous elevations, and to promote the healing of ulcers. About from half a drachm to a drachm of the salt may be added to a fluidounce of water. When used as a caustic, it must be applied in the form of powder. Its solution possesses very powerful antiseptic properties, and will be found advantageous in cases of gangrene, dry mortification, etc. This salt is also used as a source of chromic acid, of oxygen,

and in the forming artificial valerianic acid for the purpose of preparing valerianate of soda.

POTASSÆ BISULPHAS. *Bisulphate of Potassa.*

Preparation.—Take of the residuum, in the preparation of pure Nitric Acid *two pounds*; commercial Sulphuric Acid *seven fluidounces and one fluidrachm*, (Imperial Measure); Boiling Water *six pints*, (Imp. Meas.) Dissolve the Salt in the Water, add the Sulphuric Acid, concentrate the solution, and set it aside to cool and form crystals.

History.—The salt which remains after the distillation of nitric acid is a bisulphate of potassa; but Mr. Phillips states that when it is dissolved in water, and the solution allowed to crystallize, some sulphate and much sesquisulphate are obtained instead of bisulphate, owing to the water retaining a part of the excess of acid in solution. By the addition of sulphuric acid this result is prevented, and the bisulphate forms in crystals. The above is the formula of the Edinburgh College; the Dublin College have given another, which also yields a pure bisulphate—it is as follows: Take of Sulphate of Potassa, in powder, *three ounces*, (Avoirdupois); Pure Sulphuric Acid *one fluidounce*, (Imp. Meas.) Place the Acid and Salt in a small porcelain capsule, and to this apply a heat capable of liquefying its contents, and which should be continued until acid vapors cease to be given off. The Bisulphate, which concretes as it cools, should be reduced to a fine powder, and preserved in a well stopped bottle.

Bisulphate of Potassa crystallizes in small oblique, flattened, right-rhombic prisms; or when obtained by extreme concentration and cooling, it has the appearance of a firm, fibrous mass. It is a white salt, with a bitter and strongly acid taste, the crystals being permanent in the air, while the fibrous mass effloresces. It is soluble in twice its weight of cold, and in less than its weight of boiling water. It is insoluble in alcohol, which precipitates the neutral sulphate from the aqueous solution. Exposed to a moderate heat it fuses and runs like oil; at a red heat, it is deprived of water and its excess of acid, and is converted into the neutral sulphate. It is *incompatible* with many of the metals, most oxides, the alkalies, earths, and their carbonates. It may be distinguished from other salts by its strong acid taste, and by its brisk effervescence with an alkaline carbonate, the solution after effervescence, presenting the characters of the neutral sulphate. This salt was formerly known by the name of *sal enixum*. It is composed of two equivalents of acid 80.2, one of base 47.15, and two of water 18=145.35; its formula is $2\text{SO}_3 + \text{KO}$, 2 Aq.

Properties and Uses.—Bisulphate of Potassa is laxative and tonic, and is beneficial in constipation accompanied with a deficient appetite, especially during convalescence from acute disease; and is said to form a grateful adjunct to rhubarb. A drachm, each, of the bisulphate, and

Word carb
= Pearl carb.

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of carbonate of soda, dissolved separately, each in two fluidounces of water, and then mixed, forms a good aperient effervescent draught. The dose of the bisulphate is one or two drachms.

POTASSÆ CARBONAS. *Carbonate of Potassa.*

Preparation.—Take of Impure Carbonate of Potassa, (pearlash) in powder, *three pounds*; Water *two pints and a half*. Dissolve the impure carbonate of potassa in the water, and filter the solution, then pour it into a clean iron vessel, and evaporate the water over a gentle fire, until the solution thickens; lastly, remove it from the fire and stir it constantly with an iron spatula until the salt granulates.—*U. S.*

History.—By the above process the impure Carbonate of Potassa is purified. The solution in cold water is allowed to stand for a few days, frequently stirring it, and is then filtered, which removes its insoluble impurities, as well as many foreign salts which have not as great an affinity for water as the carbonate, and therefore are not dissolved. The filtered solution is then placed in iron vessels, because glass is acted on by the potassa, and evaporated. In the latter part of the process, when the solution is brought nearly to dryness, it is better to keep it on the fire at a reduced heat, removing it the moment the solution thickens.

Carbonate of Potassa is in small roundish grains, white, opaque, of a nauseous alkaline and caustic taste, soapy to the touch when moist, and extremely deliquescent, forming, when exposed to the air, an oily liquid, termed by the early chemists *oleum tartari per deliquum*. It exerts an alkaline reaction on vegetable colors, is very soluble in water, and insoluble in alcohol. On account of its deliquescence it should always be kept in well stopped bottles. A red heat drives off 16 per cent. of its water without any loss of its carbonic acid; dilute sulphuric acid decomposes it, evolving 26.3 per cent. of carbonic acid. It is *incompatible* with acids and acidulous salts, muriate and acetate of ammonia, limewater, chloride of calcium, sulphate of magnesia, alum, tartar emetic, nitrate of silver, ammoniated copper, and ammoniated iron, sulphate of iron, and tincture of muriate of iron, calomel and corrosive sublimate, acetate and subacetate of lead, and sulphate of zinc. As it is not decomposed by the tartrate of iron and potassa, it may be employed with it in prescriptions. It is composed of one equivalent of acid 22, and one of base 47.2=69.2 ($\text{CO}_2 + \text{KO}$.)

The most common impurities met with, are excess of moisture, earthy matter, sulphate of potassa, chloride of potassium, and silica. Its solution supersaturated with nitric acid, will show the presence of minute portions of a sulphate by giving a faint cloudiness with chloride of barium; and of a chloride by yielding a slight precipitate with nitrate of silver. Should earthy matter be present, carbonate of soda will precipitate the nitric solution. The pure commercial carbonate may be known by five parts of it saturating 5.44 parts of tartaric acid, which has been

Chloride of
potassium

gently dried so as not to drive off any of its water of crystallization. As nearly all samples of carbonate of potassa contain more or less moisture, due allowance should be made for this in all chemical or pharmaceutical operations.

Properties and Uses.—All the carbonates of potassa are sufficiently corrosive to be energetic poisons. They occasion destruction of the mucous membranes of the fauces, œsophagus, stomach, and sometimes of the intestines—indicated at first by violent burning pain, prostration and vomiting, which is sometimes bloody, and if death does not ensue in consequence, in a few days, excessive emaciation follows, and constant irritation of the stomach and bowels. The proper antidotes to them are vinegar, lemon-juice, or fixed-oil.

Medicinally, Carbonate of Potassa is antacid, antilithic and diuretic. Useful in urinary affections, where the morbid secretion consists of lithic acid, and the lithates, for which about thirty-five grains should be given in the course of the day, in divided doses. Some prefer the potassa carbonates to the soda, for antilithic purposes, on the supposition that they are more energetic solvents. It is sometimes used in solution, as an injection into the bladder, for calculus. It has also been employed in dyspepsia, as an antacid; in dropsy, as a diuretic; and in some cases of jaundice; and combined with cochineal, it has considerable reputation in the treatment of pertussis. Dissolve carbonate of potassa, twenty grains, in a gill of water, add to it ten grains of powdered cochineal, sweeten with loaf sugar, and give an infant a teaspoonful four times a day; to a child two or three years old, two teaspoonfuls; four years and upward, a tablespoonful or more. To this preparation, five to fifteen drops of tincture of belladonna is sometimes added. Externally, it is used in the form of bath, lotion, or ointment, as an effectual remedy in obstinate cutaneous eruptions. From eight to sixteen ounces may be used for a single bath; from two to three drachms in a pint of water, for a lotion; or from ten to sixty grains with an ounce of lard, as an ointment. Dose of the powder in solution, five to thirty grains.

Off. Prep.—Extractum Spigeliæ et Sennæ Fluidum; Liquor Potassæ; Potassæ Acetas; Potassæ Bicarbonas; Potassæ Sulphas; Potassæ Tartras; Potassii Bromidum; Potassii Cyanuretum; Potassii Iodidum; Potassii Sulphuretum.

POTASSÆ CARBONAS PURUS. *Pure Carbonate of Potassa. Salt of Tartar.*

Preparation.—Take of Bicarbonate of Potassa *a pound*. Put the Bicarbonate, previously powdered, into a capacious iron crucible, heat gradually until the water of crystallization is driven off, then raise the heat to redness, and maintain that temperature for half an hour. Having taken the crucible from the fire, and allowed it to cool, remove its contents, dissolve them in Distilled Water, filter the Solution, and

complete the process by evaporating and granulating as directed for Carbonate of Potassa.—*U. S.*

History.—In the above process, by ignition of the bicarbonate of potassa, it is deprived of one equivalent of carbonic acid together with its water of crystallization, and the carbonate remains. The bicarbonate being usually a very pure salt, the carbonate procured from it is likewise as pure.

Pure carbonate of potassa differs from the carbonate in holding no impurities; its actions are the same. It was formerly called *Salt of Tartar*, but, the greater part of this salt at present found in the shops, is the ordinary carbonate as purified from pearlash. It may also be made as follows; take of Bitartrate of Potassa (cream of tartar), *two pounds*; Nitrate of Potassa, *a pound*. Rub them separately into powder, then mix, and throw them into a brass vessel, heated nearly to redness, that they may undergo combustion. From the residue prepare the purest carbonate of potassa, in the manner directed for the carbonate.

Properties and Uses.—Precisely the same as those of the Carbonate of Potassa.

The Liquor Potassæ Carbonatis, *Solution of Carbonate of Potassa*, is made by dissolving one pound of Carbonate of Potassa in twelve fluid ounces of Distilled Water, and then filtering the solution. The dose is from ten to sixty drops, sufficiently diluted with water or other bland liquid.

POTASSÆ CHLORAS. *Chlorate of Potassa.*

Preparation.—Dissolve *one equivalent* of Caustic Potassa in *sufficient* Water to form a Solution, containing $10\frac{1}{4}$ per cent. of the alkali (sp. gr. 1.110), then mix the solution with Hydrate of Lime (Quicklime), *five and a half equivalents*; heat the mixture gradually to 122° , and subject it to a rapid current of Chlorine to saturation, the reaction caused by which raises the temperature to about 194° . The product is then evaporated nearly to dryness, the residue dissolved in Boiling Water, and the Solution filtered and set aside to crystallize.

History.—This is the process of Prof. F. C. Calvert of Manchester, by which 260 parts of chlorate are obtained from 100 of anhydrous potassa, while by the old methods but 43 parts were procured. In the above process the combination of chlorine with the calcium, instead of the potassium, is determined by the temperature and the strength of the potassa solution; while the chlorine is converted into chloric acid by the oxygen from the lime. A higher or lower density of the solution of potassa gives less favorable results.

Chlorate of Potassa crystallizes in four or six-sided rhomboidal platea, white, of a pearly luster, and permanent in the air. It has a cooling, saline taste like that of nitre. It is soluble in two and a half parts of

boiling water, and in sixteen parts of water at 60° . Heat fuses it, and if carried to a little beyond its point of fusion, nearly 39 per cent. of oxygen is disengaged, leaving a residuum of chloride of potassium. It is due to this escape of oxygen that the combustion of burning fuel is enlivened when the salt is thrown upon it. Mixed with a little sulphuric acid it becomes first yellow, and then red, and chlorous acid gas (quaroxide of chlorine) is evolved, which has a yellow color, and is explosive when heated. When triturated with a small piece of phosphorus or sulphur, a violent explosion ensues; mixed first with muriatic acid, and then with water it becomes possessed of bleaching power. It consists of one equivalent of chloric acid 75.42, and one of potassa $47.2 = 122.62$, ($\text{ClO}_5 + \text{KO}$).

From faulty preparation, its most common impurity is chloride of potassium. This may be detected by the addition of nitrate of silver to its solution, which will occasion a white precipitate of chloride of silver, if the impurity be present.

Properties and Uses.—Chlorate of potassa is considered a refrigerant and diuretic; and has been used in cholera, and in malignant fevers for promoting the arterialization of the blood; it is also said to moisten and clean the tongue. According to Dr. O'Shaughnessy and other physicians, it passes unchanged into the urine, and imparts a bright scarlet color to the venous blood. It has been used with considerable benefit in scurvy, syphilis, and liver complaint; and is strongly recommended in cancrum oris, given in solution, in divided doses, to the amount of from ten to sixty grains in twenty-four hours, according to the age of the child. It lessens the fetor and salivation attendant on the disease, and promotes granulation. Internally, and used as a mouth wash, it has been recommended in erysipelatous inflammation of the mouth and fauces, occurring in black tongue. The dose is from ten to thirty grains; and the mouth wash made by dissolving a drachm of the salt in four fluidounces of water.

POTASSÆ SESQUICARBONAS. *Sesqui-carbonate of Potassa. Vegetable Caustic.*

Preparation.—Take of Bicarbonate of Potassa *one pound*; Water a *sufficient quantity*. Dissolve the Bicarbonate in the Water, strain and then evaporate by means of heat raised to a very few degrees above the boiling point; when sufficiently concentrated set aside to cool. Dry the resulting sesquicarbonate by a gentle heat.

History.—This is the method at present pursued in the preparation of the *Vegetable Caustic*. The bicarbonate of potassa becomes partially decomposed during the evaporating process, but whether it is converted into a true sesquicarbonate of potassa ($2\text{KO}, 3\text{CO}_2$), or is deprived of half its carbonic acid, remains yet to be determined.

Sesquicarbonate of Potassa, as prepared by the above process, is sold

in the form of a white powder, having a pungent, but not very powerful, alkaline odor, a sharp, strongly alkaline taste, is permanent in dry air, very soluble in water, but insoluble in alcohol. It is *incompatible* with the same substances as the Carbonate of Potassa.

The above preparation differs very materially from the original *vegetable caustic*, which was prepared by making a strong ley of hickory or oak-wood ashes, and evaporating it, in an iron kettle, to dryness. This formed an impure caustic potassa, of a dingy-gray or greenish color, very caustic, but less so than the hydrate of potassa, very deliquescent, and soluble in water. It is more severe in its action than the sesquicarbonate, and has occasionally to be employed in cases where that exerts but little or no beneficial influence. As it rapidly attracts moisture from the atmosphere, it must, as soon as prepared, be placed in green glass bottles with good corks or stoppers.

Properties and Uses.—Each of these preparations are escharotic, but do not, like the hydrate of potassa, destroy or decompose the healthy tissues; their action appears to be altogether exerted upon abnormal growths and conditions of parts. They are employed as local applications to fistulas, cancers, fungous growths, indolent ulcers, unhealthy conditions of mucous tissues, as in ophthalmic affections, disease of the Schneiderian membrane, of the mouth and throat, urethra, vaginal walls, and cervix-uteri. In solution, it has been injected into the uterus in dysmenorrhea, uterine leucorrhea, etc., without any unpleasant symptoms arising. In these latter cases the milder sesquicarbonate must be used, commencing with a weak solution, and gradually increasing in strength, until the maximum degree that can be used, is obtained. Upon healthy tissues these agents exert but very feeble action; and in unhealthy conditions they bring about a normal action without exciting an undue degree of inflammation. They are peculiarly Eclectic agents of great value.

POTASSÆ SULPHAS. *Sulphate of Potassa.*

Preparation.—Take of the Salt which remains after the distillation of Nitric Acid *two pounds*; Boiling Water *two gallons*. Ignite the Salt in a crucible until the excess of the Sulphuric Acid is entirely expelled; then boil it in the two gallons of Water until a pellicle forms, and, the liquor being strained, set it aside that crystals may form. Pour off the liquor from the crystals and dry them.

History.—When a mixture of Nitre and Sulphate of Iron is calcined for the purpose of obtaining nitric acid, the residue consists of sulphate of potassa and sesquioxide of iron; the former may be separated from the latter by solution in water, concentration, and crystallization. The sulphate may also be procured by other processes, as by the action of sulphuric acid on nitre in the distillation of nitric acid; by the decomposition which ensues when carbonate of potassa and sulphate of

magnesia react upon each other, during the preparation of carbonate of magnesia, etc.

The salt which remains after the distillation of nitric acid, is a super-sulphate of potassa, and by the application of heat to remove the excess of acid, it is brought into the neutral state. The excess of acid may also be removed by the addition of white marble, or slaked lime, either of which become converted into insoluble sulphate of lime. This accomplished, the liquor or solution of the sulphate of potassa is strained, evaporated, strained again, and allowed to cool, when the crystals form. This salt also occurs in volcanic regions and in the juices of plants; but the medicinal article is always an artificial preparation. It has at different times been known under the names of *Sulphate of Kali*, *Vitriolated Tartar*, *Sal-Polychrest*, *Sal de Duobus*, etc.

Sulphate of potassa occurs in small, aggregated, transparent, white, very hard crystals, whose primary form is the right rhombic prism or rhombic octaëdre, but which generally are short six-sided prisms terminated by six-sided pyramids. They have a sharp, saline, bitterish, and nauseous taste, are permanent in the air, soluble slowly in about nine and a half parts of cold water, soluble in nearly four times their weight of boiling water, and insoluble in alcohol. Heat causes a slight decrepitation; and a strong red heat fuses them, but without change; heated with carbonaceous matter the sulphate is deoxidized, and sulphuret of potassium formed. A solution of sulphate of potassa slightly acidulated with nitric acid, yields a white precipitate with chloride of barium, and a yellow one with chloride of platinum. It is *incompatible* with tartaric acid which unites with it to form bitartrate of potassa, and with the soluble salts of lime, silver, strontia, baryta, and lead, with which it forms insoluble or sparingly soluble sulphates. It is not subject to adulteration. It is composed of one equivalent of acid 40, and one of potassa $47.2=87.2$, (SO_3+KO).

Properties and Uses.—Sulphate of potassa is a mild cathartic, and causes but little pain, heat, or irritation during its operation. In doses of one or two ounces, it acts as a powerful irritant, and has given rise to fatal accidents. It has been used as an aperient after delivery, for the purpose of removing visceral obstructions of children attended with defective digestion and nutrition, and tumid abdomen, and in jaundice and dyspeptic affections. The dose as an aperient is from a scruple to half a drachm; in larger doses, say four or five drachms, it acts slowly as a purge. It should always be sufficiently diluted with water, when administering it.

POTASSÆ SULPHAS CUM SULPHURE. *Sulphate of Potassa with Sulphur.*

Preparation.—Take of Nitrate of Potassa, in powder, and of Sublimed Sulphur, *equal weights*. Mix them well together, and throw the mixture, by small portions at a time, into a red hot crucible. When the

deflagration is over, allow the Salt to cool, and place it in a glass vessel well stopped.

History.—As the above named portions of the mixture are thrown into the red-hot crucible, they melt, and on the surface of the fused mass floats the sulphur, having the appearance of a brown oil; it burns with a blue flame, throwing out in copious quantity sulphuric acid gas, and becoming oxidated at the expense of the nitric acid of the nitre, which is totally decomposed, and enabled to furnish a sufficient quantity of oxygen for the above purpose. The product of this deflagration is a grayish-white friable substance, the nature of which has not been ascertained.

It has an acid and sulphurous taste, and an acid reaction with test-paper; it is much more soluble in water than sulphate of potassa, giving off a sulphurous smell during its solution, which solution is yellowish. Sulphureted hydrogen is not obtained on the addition of an acid to it, nor is sulphuret of lead thrown down by the salts of lead. Its powder is pale yellowish-white; and it dissolves in eight times its weight of cold water. A white precipitate, insoluble in nitric acid, is occasioned by the salts of barium, so that sulphate of potassa is present, and with which, its other properties coincide. Even when prepared with equal care, it exhibits, in different specimens, some variety in its properties.

Properties and Uses.—This preparation is considered a mild cathartic, resembling very much in its action, that of the sulphate of potassa. It was formerly much in vogue as a purgative in dyspepsia, chronic cutaneous eruptions, etc. The dose is from half a drachm to a drachm, and generally given with some other gentle laxative, as bitartrate of potassa.

POTASSÆ TARTRAS. *Tartrate of Potassa. Soluble Tartar.*

Preparation.—Take of Carbonate of Potassa *sixteen ounces*; Bitartrate of Potassa, (Cream of Tartar,) in powder, *three pounds* or a *sufficient quantity*; Boiling Water *a gallon*. Dissolve the Carbonate of Potassa in the Water, then gradually add the Bitartrate of Potassa, until effervescence ceases, or until the solution is perfectly saturated, then boil. Filter the solution through paper; then evaporate it till a pellicle forms, and set it aside to crystallize. Pour off the Water, dry the Crystals upon bibulous paper, and keep them in closely stopped bottles.—*U. S.*

History.—Tartrate of Potassa, also known by the names of *Soluble Tartar*, *Sal Vegetabile*, and *Tartarized Kali*, was known as early as the seventeenth century. In the above process for obtaining it, the potassa of the carbonate saturates the excess of acid of the bitartrate, while at the same time the carbonic acid is given off with effervescence, and at the termination a neutral tartrate of potassa is formed. As the carbonate of potassa is more readily soluble than the bitartrate, it should be dissolved first, and the latter added, (promoting the action by constant

stirring,) until the saturation is completed, and which may be known by the cessation of effervescence. As the solution should be neutral, or very slightly alkaline, should too much bitartrate have been added, the solution may be changed to its proper neutrality by a little more of the carbonate. After saturation, the tartrate of lime, which is deposited in white flocks, must be separated by filtration, and the evaporated solution then placed in warm earthenware vessels, (not iron, as it is apt to discolor the salt,) to procure a gradual cooling, and after several days, the crystals commence forming. If the solution be somewhat alkaline, crystallization ensues more favorably.

Tartrate of potassa, when properly prepared, is in the form of white, transparent crystals, which are right rhombic prisms, or irregular six-sided prisms, terminated by two converging planes. It has a mildly saline, bitterish taste, is neutral to test paper, becomes moist in damp air without deliquescence, is soluble in about twice its weight of cold water, and in much less of boiling water, and is almost insoluble in alcohol. At a heat of 250° , its water of crystallization is driven off, but without fusion, and it becomes anhydrous; at a higher heat it is decomposed, fusing, swelling up, and becoming finally converted into charcoal and carbonate of potassa. The crystals alone should be employed for medical use, and not the white granular powder of the shops, obtained by constantly stirring the solution while evaporating to dryness. It is seldom adulterated. It is *incompatible* with all the strong acids, and with many acidulous salts. Its solution is precipitated by the salts of baryta, silver and lead, forming white tartrates of the metallic oxides, which are soluble in dilute nitric acid. It is composed of one equivalent of acid 66, and one of potassa $47.2=113.2$ —the crystals having no water of crystallization, $\text{KO}, \text{C}_4 \text{H}_2 \text{O}_5$.

Properties and Uses.—Tartrate of potassa is a mild cooling purgative, operating without much pain, and producing watery stools. Used in febrile diseases, and occasionally combined with senna to obviate its griping effects. Dose, from a drachm to an ounce.

POTASSII BROMIDUM. *Bromide of Potassium.*

Preparation.—Take of Bromine *two ounces*; Iron Filings *an ounce*; Carbonate of Potassa *two ounces and a drachm, or a sufficient quantity*; Distilled Water *four pints*. Add first the Iron Filings, and afterward the Bromine, to a pint and a half of the Distilled Water, stirring the mixture frequently with a spatula for half an hour. Apply a gentle heat, and, when the liquor assumes a greenish color, add gradually the Carbonate of Potassa, previously dissolved in a pint and a half of the Distilled Water, until it ceases to produce a precipitate. Continue the heat for half an hour, and then filter. Wash the precipitate with the remaining pint of Distilled Water, boiling hot, and filter. Mix the filtered liquors, and evaporate so that crystals may form. Lastly, pour off the liquid, and dry the crystals on bibulous paper.—*U. S.*

History.—In this process, the addition of the iron and bromine to the water, forms a solution of bromide of protoxide of iron, which is decomposed by the subsequent addition of the carbonate of potassa, the carbonate of protoxide of iron being precipitated, while the bromide of potassium is held in solution. The carbonate of iron is separated from the solution by filtration, and by the evaporation bromide of potassium is obtained in crystals.

Bromide of Potassium crystallizes in cubes or rectangular four-sided tables, which are permanent in the air, of a pearly luster, and anhydrous; and possessing a pungent, saline taste, somewhat like that of common salt. It is very soluble in water, sparingly so in alcohol, decrepitates when heated, and at a red-heat fuses without becoming decomposed. Its aqueous solution has no action on litmus or turmeric, is not precipitated by chloride of barium, but is decomposed by sulphuric, nitric, and muriatic acids, which set free bromine, and the liquid becomes brown. Mixed with starch and then acted upon by sulphuric acid, the bromine is disengaged, and the liquid becomes yellow. Nitrate of silver 14.28 grains are required to completely precipitate ten grains of the bromide of potassium, the precipitate being yellowish. A few drops of a weak solution of chlorine added to its solution, will indicate the presence of iodine, by imparting a faintly blue or violet color to a piece of white paper moistened with the liquid. It is composed of one equivalent of bromine 78.4, and one of potassium 39.2=117.0, (K Br.)

Properties and Uses.—Bromide of Potassium is considered an alterative and resolvent. It has been recommended in enlarged spleen, scrofula, secondary and tertiary syphilis. In the latter diseases, its effects are slow and unsatisfactory compared with those of Iodide of Potassium; in large doses it is said to produce nausea, gastric derangements, drowsiness, torpor, anæsthesia of the fauces, and debility of the genital organs. Externally, it has been used in the form of ointment, in conjunction with its internal use, or that of iodine, and has proved efficacious in bronchocele, scrofula, and enlarged spleen. The dose of it is from three to ten grains, three times a day, in pill or solution. The ointment is made by mixing from two scruples to two drachms of the bromide with an ounce of lard; of which from one-fourth to one-half may be rubbed over the affected part, once in twenty-four hours.

POTASSII CYANURETUM. *Cyanuret of Potassium.*

Preparation.—Take of Ferrocyanuret of Potassium, dried, *eight ounces*; Carbonate of Potassa, dried, *three ounces*. Mix the salts intimately, and throw the mixture into a deep iron crucible previously heated to redness; maintain the temperature till effervescence ceases, and the fused mass concretes, of a pure white color, upon a warm glass rod dipped into it; then pour out the liquid carefully into a shallow dish to solidify, stopping before the Salt becomes contaminated with the precipitated

iron. Break up the mass while yet warm, and preserve it in well stopped bottles.—*U. S.*

History.—In this process two equivalents of carbonate of potassa, and two of ferrocyanuret of potassium react upon each other; carbonic acid is evolved, iron is set free, and a compound is formed consisting of five equivalents of cyanuret of potassium, and one of cyanate of potassa. The iron settles at the bottom of the fused liquid, which must be carefully poured off to avoid any contamination with the iron. The cyanate of potassa is not present in sufficient quantity to injure the medicinal action of the salt; and it may be detected by saturating the product with an acid, which will evolve carbonic acid with effervescence, and give rise to an ammoniacal salt.

The process for preparing cyanuret of potassium, according to the French Codex, is to half fill a coated stoneware or iron retort with the ferrocyanuret, attach a tube to it for the purpose of collecting the gaseous products, and apply heat, until the gases cease to be disengaged; then raise the heat to a very high temperature which must be maintained for half an hour. After this calcination, a black substance will be found in the retort, covered with a fused layer of pure cyanuret of potassium, resembling white enamel, which should be at once removed and placed into a well stopped bottle. The remaining mass is an impure black cyanuret of potassium.

Cyanuret of potassium, as prepared by the above formula, is amorphous, white, and opaque, deliquescent in moist air, soluble in water, but sparingly so in alcohol. It has a sharp, alkaline, bitter-almond taste, and an alkaline reaction. It is always white when pure, but any contamination with iron renders it yellow. Exposed to the air it loses its strength gradually either in mass or solution. As found in commerce it varies considerably in regard to purity; the usual impurities are water, carbonate, cyanate, and formiate of potassa. Nitrate of silver added to its solution precipitates cyanuret of silver, which is completely soluble in ammonia. Cyanuret of potassium is composed of one equivalent of cyanogen 26, and one of potassium 39.2=65.2, (K Cy).

Properties and Uses.—Cyanuret of Potassium is poisonous, acting precisely like hydrocyanic acid. Medicinally, it has been proposed as a substitute for that acid, on account of its greater uniformity of strength, and its less liability to decomposition. The dose is one-eighth of a grain, dissolved in half a fluidounce of distilled water, to which may be added some aromatic syrup, or if it is desired to set free the hydrocyanic acid, half a fluidrachm of lemon-syrup may be added. Great care must be employed in using this preparation. Externally, four grains of the salt to a fluidounce of distilled water, has been efficaciously used in neuralgic and other local pains, applied by means of lint or linen. The

solution dropped into the eye every other day, will, it is said, remove the olive colored stains of the conjunctiva, produced by the nitrate of silver.

POTASSII IODIDUM. *Iodide of Potassium.*

Preparation.—Take of Potassa *six ounces*; Iodine, in powder, *sixteen ounces*; Charcoal, in fine powder, *two ounces*; Boiling Water *three pints*. Dissolve the Potassa in the Water, add the Iodine gradually, stirring after each addition until the solution becomes colorless, and continue the additions until the liquid remains slightly colored from excess of Iodine. Evaporate the solution to dryness, stirring in the Charcoal toward the close, so that it may be intimately mixed with the dried Salt. Rub this to powder, and heat it to dull redness in an iron crucible, maintaining that temperature for fifteen minutes; then, after it has cooled, dissolve out the saline matter with pure Water, filter the solution, evaporate, and set aside to crystallize. An additional quantity of Crystals may be obtained from the residual liquid by evaporating and crystallizing as before.—*U. S.*

History.—In this process, a slight excess of iodine is added to an aqueous solution of potassa, which results in the formation of two salts, Iodate of Potassa and Iodide of Potassium. The reaction of six equivalents of iodine with six of potassa, gives rise to the formation of five equivalents of iodide of potassium, and one of iodate of potassa. These salts are obtained together by evaporating the solution to dryness; and to convert the iodate into iodide of potassium, the dried mass is exposed to a dull-red heat. The addition of charcoal toward the termination of the evaporation facilitates the deoxidation of the iodate, by exposure to a dull-red heat. The iodide of potassium is then dissolved from the mass, the solution filtered, evaporated, and set aside to crystallize.

Iodide of Potassium, when pure, is in crystals or fragments of crystals, which are cubes or four-sided prisms, with a slight tendency to the rhombic form. They are colorless, and opaque, with a faint odor of iodine, and a sharp, saline taste. In dry air they are permanent, but slightly deliquescent in a moist one. They have but little influence on litmus or turmeric. They dissolve in about two-thirds their weight of cold water, and in from six to eight parts of alcohol. Sulphuric acid decomposes a solution of iodide of potassium, producing hydriodic acid, which rapidly decomposes, setting free iodine; if starch be added, the liquid is changed to a blue color, after standing a short time; but if any iodate be present, the blue color appears at once, in consequence of the immediate liberation of iodine. Tartaric acid added freely to a concentrated solution of iodine of potassium, occasions a white crystalline precipitate, and if starch be added to the supernatant liquid, it becomes first purple and then blue. Its solution is colored brownish-red by the addition of chloride of platinum, without occasioning a precipitate; it is but little

affected by chloride of barium ; and not at all by sulphate of iron, unless carbonate of potassa be present, when a whitish or greenish-white precipitate occurs, which effervesces on the addition of a diluted acid. A low red-heat fuses it, giving a crystalline pearly mass on cooling ; a full red-heat volatilizes it without decomposition. The solution of iodide of potassium possesses the property of dissolving a large quantity of iodine, forming a liquid of a deep-brown color, containing the iodureted iodide. Iodide of potassium consists of one equivalent of iodine 126.3 and one of potassium 39.2=165.5, (KI).

It is exceedingly subject to adulteration, both from faulty manufacture, and fraudulent admixture. The most usual impurities are the iodate of potassa, carbonate of potassa, chlorides of sodium and potassium, and water. Iodate of potassa is generally present only as an accidental impurity ; it may be detected by its insolubility in alcohol ; also by the rich blue color produced at once by the addition of tartaric acid and starch solution. When pure, neither the iodide of potassium, nor the iodate of potassa are thus affected, but only when they become mixed. Carbonate of potassa may be present in the proportion of from one to five per cent., and even ten, without altering the crystalline appearance of the iodide ; but it increases its tendency to deliquesce. When the proportion is greater than this the iodide becomes granular and highly deliquescent. This impurity may be detected by the insolubility of the carbonate in alcohol ; by the addition of limewater, which precipitates a milky carbonate of lime ; and by its destroying the color of tincture of iodine when it is added to the solution. Chloride of sodium or potassium may be detected by the addition of nitrate of silver, which, if the salt be pure, will precipitate iodide of silver, which is hardly soluble in ammonia ; but if the precipitate be soluble in ammonia it is a chloride of silver, and the salt is rendered impure by the presence of a chloride. If the ammonia be saturated with nitric acid, it will give up the chloride of silver as a white precipitate ; but if no chloride be present, the ammonia, as before said, takes up a very minute portion of iodide of silver, and the subsequent addition of nitric acid, will hardly disturb the transparency of the solution. The presence of water may be detected by heating the iodide in a glass tube, upon which the water will condense in the upper part of the tube. Bromide of potassium is also an adulteration which may be detected by bichloride of mercury, with which it causes no precipitate. Or, it may be detected by adding to an aqueous solution of the iodide, successively and in excess, a solution of sulphate of copper, and aqueous sulphurous acid ; filter the liquor, and treat it with ether and chlorine water. Shake the whole together and allow it to rest ; if the ether, which rises to the surface, be tinged of a reddish-yellow color, bromine is present. Iodide of Potassium is often incorrectly called by the name of *Hydriodate of Potash*.

Properties and Uses.—In large doses Iodide of Potassium is an irritant. In small doses it is diuretic and alterative; it has been detected in the urine, in six minutes after being swallowed. This may be accomplished by adding a portion of starch to the cold urine, and then a few drops of nitric acid; if the iodide be present, this will produce a blue color. In some constitutions Iodide of Potassium produces peculiar symptoms, such as dryness and irritation of the throat, irritation of the mucous membrane of the air passages, various cutaneous eruptions, excessive diuresis, cerebral excitement resembling that caused by alcoholic liquors, vascular injection of the conjunctiva and tumefaction of the eyelids, and discharges from the vagina and urethra, simulating blennorrhea. Upon ceasing the use of the medicine, these various symptoms gradually disappear. Iodism is occasionally caused by it, or some of the symptoms characterizing that influence. It appears to be more especially useful in goitre, strumous enlargement of the glands, strumous sores and eruptions, strumous ophthalmia, syphilitic affections, mammary tumors, enlargement of the liver, amenorrhea, leucorrhea, mercurio-syphilitic sore-throat, mercurial cachexy, and indeed all tubercular affections of serous tissues. It is extensively employed in the above forms of disease, by Eclectics, in combination with the Compound Syrup of Stillingia, in the proportion of four drachms of the Salt to a pint of the Syrup. When taken for a length of time, and especially if used in rather large doses, it will excite ptyalism, and frequently an affection of the mucous membranes of the air passages, very much resembling a cold in the head. The dose of it is from two to ten grains; it should always be given in solution and well diluted, and should also be prescribed in the simplest possible form, on account of its numerous chemical relations with other bodies, many of which decompose it, and form insoluble iodides.

Off. Prep.—Liquor Iodinii Compositus; Pilulæ Ferri Iodidi; Tinctura Iodinii Composita; Unguentum Iodinii Compositum.

POTASSII SULPHURETUM. *Sulphuret of Potassium. Hepar. Liver of Sulphur.*

Preparation.—Take of Sulphur *on ounce*; Carbonate of Potassa *two ounces*. Rub the Carbonate of Potassa, previously dried, with the Sulphur; melt the mixture in a covered crucible over the fire; then pour it out on a marble slab, and as soon as cold, break it into pieces, and put them into a well stopped bottle.—*U. S.*

History.—By the above process a mixture is obtained of tersulphuret of potassium with sulphate of potassa. On the application of heat to the mixture, the carbonic acid of the carbonate is expelled. We may suppose, in this operation, that ten equivalents of sulphur react on four of potassa. Of the potassa, three equivalents are decomposed and converted into three of oxygen and three of potassium. These latter three

combine with nine equivalents of the sulphur, and form three equivalents of tersulphuret of potassium. The remaining equivalent of sulphur is converted into sulphuric acid by the action of the three equivalents of oxygen, and sulphate of potassa is formed by the combination of this gas with the undecomposed equivalent of potassa.

The best formula for the preparation of sulphuret of potassium is that of M. Henry; he mixes one part of roll sulphur, in powder, with two parts of pure salt of tartar, and places the mixture into flat-bottomed matrasses, each of which should be only two-thirds filled. These are placed on a sand-bath, and heat applied at first gentle, but finally increased, and continued until the whole is thoroughly fused, when it is allowed to cool. The necks of the matrasses must be kept free from any obstruction. The resulting mass is smooth, compact, and of a fine yellow color; it should be placed in well stopped bottles after having been broken into pieces.

Sulphuret of potassium is a hard, brittle substance, of a liver-brown color, having a nauseous, bitterish, and alkaline taste, and no odor when dry. When moistened with water it emits a very fetid smell, owing to the disengagement of sulphureted hydrogen. When exposed to the air, it gradually absorbs oxygen, and undergoes a series of changes, resulting in the formation of sulphate of potassa and free sulphur, and the mass becomes inodorous, and white on its surface. It is soluble in water, forming an orange-yellow solution, with a strong smell of sulphureted hydrogen. It is *incompatible* with the mineral acids which precipitate sulphur, and free sulphureted hydrogen, and with most metallic solutions which are thrown down as sulphurets. Winckler has found specimens of it to consist of tersulphuret of potassium 53.3 parts, hyposulphite of potassa 29.5, sulphite of potassa 7, together with a small quantity of sulphate and carbonate.

Properties and Uses.—Sulphuret of Potassium is a local irritant, producing in doses of a few drachms dangerous inflammation of the alimentary canal with tetanic spasms; sometimes it acts as an emetic and cathartic. In small doses, and repeated, it is said to increase the temperature of the surface, also the frequency of the pulse, and to augment the secretions, particularly those from mucous membranes. It is likewise antacid, alterative, and antispasmodic, and has been advantageously employed in chronic rheumatism and gout, various cutaneous affections, painter's colic, chronic catarrh, asthma, and hooping-cough. Externally, it has been very efficacious in scabies and other cutaneous diseases, in the form of lotion, bath, or ointment. For a lotion, or ointment, fifteen to thirty grains of the sulphuret may be dissolved in one ounce of water, or mixed with an ounce of lard—and for a bath the same quantity may be added to each gallon of water. The dose, internally, is from two to ten grains, three or four times a day, in solution with syrup, or given in pill form with liquorice.

PULVERES.

Powders.

Medicines which have no very unpleasant taste, no corrosive action, which are not deliquescent, and which do not require to be given in very large doses, are the most conveniently administered in the form of powder. When an article is reduced to powder, it has a much greater surface exposed to the action of the air and light, than when in the crude, aggregate mass; and as many, if not all Powders, are more or less injured by the action of these agents, it is always better to keep them in well stopped bottles, and excluded from the action of light, by a coating of black varnish, or by other means. Were druggists to pursue this rule, they would find it very advantageous in many respects. Some agents, notwithstanding even these precautions, lose their virtues rapidly when in the state of powder; such should be pulverized in small quantities at a time, and only as they are required. As a general rule, the finer the Powder, or the longer it is triturated, the more active it becomes. And in the various preparations of the Alkaloids, and Resinoids, care must be taken, in all instances, to triturate for at least nearly half an hour, which renders them much more energetic and effectual in their results. M. Dorvault thinks that the operation of pulverization effects an actual change in the chemical and therapeutical properties of many agents. Sugar is less soluble in water, and less sweet, when long pulverized or triturated—and, he inquires, Is this to be referred to an altered electrical condition of the sugar, as the phosphorescence developed during the act of pulverization in the dark would lead us to suppose? Gum arabic powdered, has not the same taste, nor the same solubility, as when in the entire state. If a given quantity of water may be made to dissolve forty parts of arsenious acid in the vitreous state, the same quantity of water can be made to dissolve only fourteen parts after pulverization. (*Annals of Pharmacy, May, 1852.*) Changes of this kind may ensue from the action of light, the oxygen of the atmosphere, its nitrogen, or its electricity, etc., upon matter reduced to such a state of fineness that nearly every part of it is exposed to the peculiar agent which effects these changes.

Simple powders are those which consist of a single substance; *compound powders*, those containing two or more ingredients mixed together. As the substances entering into the formation of a compound powder may be of various textures and densities, it is generally, preferable to pulverize each article separately, then mix and triturate them together thoroughly. Some articles, however, require the intervention of another before they can be reduced to powder, as Camphor, which is pulverized by the addition of a few drops of alcohol; or Camphor and Opium which require the addition of sugar or gum Arabic; others again, are powdered with facility by the aid of a harder substance. Medicines that contain

a large proportion of fixed oil, or which are deliquescent should never be prescribed in powders, especially when they are to be kept, as the latter are apt to injure the preparation by their moisture, while the former may destroy it in consequence of rancidity. Articles which are *incompatible* should never be united together, unless the decomposing compound is required. When volatile or deliquescent substances are prescribed in powders, as camphor, carbonate of ammonia, or carbonate of potassa, they should be divided in waxed papers, and inclosed in tin foil, a tin box, or a wide mouthed vial before delivering them. The paper used for powders of ordinary character, should be very smooth, or glazed, to prevent the powder from adhering to it, and sufficiently soft and yielding to be opened or closed readily, without springing so as to throw out any portion of the powder. Some apothecaries fold up their powders in foolscap paper, and these when opened by the patient, in consequence of their stiffness, spill or throw out a very material proportion of the medicine. When a powder is prescribed in bulk, leaving it to the patient to apportion the dose, unless otherwise desired, it should always be put into a wide mouthed vial.

The old absurd and unscientific style of combining eight or ten articles in one preparation is fortunately becoming unpopular, and though a few preparations of the kind are retained, yet the major amount of our present compounds consist of but two or three, and never exceeding four substances; in the former, the articles were too frequently thrown together without any guide or rule, or any regard to compatibilities, and though benefit might be derived from these heterogeneous mixtures, it was always difficult to ascertain upon which article or articles the effect depended, or whether it was owing to a third agent, the result of decomposition.

In preparing powders, the proper plan is to dry the article, then beat it in an iron mortar, and after a short trituration, sift it through a fine sieve, and return the coarser parts to the mortar, and repeat this alternate pulverization and sifting several times until the process is completed. When very active articles, such as strychnia, chloride of gold, atropia, etc., are to be given in the form of powders—gum, sugar, sugar of milk, starch, or marsh-mallow should be triturated with them, in order to facilitate their reduction to minute division.

Light powders may be given in water, gruel, milk, etc.; heavy ones require syrup, molasses, honey, or one of the confections; always bearing in mind whether the vehicle be compatible with the active ingredients of the powder.

PULVIS ASCLEPIÆ COMPOSITUS. Compound Powder of Pleurisy Root.

Preparation.—Take of Pleurisy Root, and Spearmint, each in powder, and Sumach Berries, of each, *two ounces*; Bayberry Bark and Skunk Cabbage, of each, in powder, *one ounce*; Pulverized Ginger *half an ounce*. Mix them.

Properties and Uses.—Very useful diaphoretic in coughs, colds, and as a drink in febrile diseases. Two drachms of the powder may be infused in half a pint of boiling water, sweetened, and drank in wine-glassful doses, every hour or two. Or in common colds, the half pint of warm infusion may be taken at a draught, and repeated in an hour if necessary.—*W. S. M.*

PULVIS CAMPHORÆ COMPOSITUS. *Compound Powder of Camphor.*

Preparation.—Take of Tannic Acid, Kino, Camphor, each, in powder, *one scruple*; Opium, in powder, *half a scruple*. Mix well together, and divide into twenty powders.

Properties and Uses.—These powders are stimulant, antispasmodic, anodyne, and astringent, and have proved highly successful in the treatment of Asiatic cholera, cholérine, and severe cholera morbus. They speedily check the discharges, and relieve the pains or cramps. The dose is one powder, to be given after each discharge from the bowels, or oftener if the urgency of the case require it. The powders may be given in molasses, quince syrup, or blackberry jelly. Where more stimulus is required, one or two grains of capsicum may be added to each dose.—*J. K.*

PULVIS CARBONIS LIGNI COMPOSITUS. *Compound Powder of Charcoal.*

Preparation.—Take of Charcoal *two ounces*; Rhubarb, in powder, *one ounce*; Bicarbonate of Soda *half an ounce*. Mix together.

Properties and Uses.—This preparation will be found very beneficial in dyspepsia, attended with acidity of the stomach, loss of appetite, constipation or diarrhea, and distress at the stomach after eating. It will prove useful in all derangements of the digestive functions where acidity of the stomach is present. The dose is a teaspoonful in water or Indian meal gruel, three or four times a day. If cream of tartar one ounce, be substituted for the Bicarbonate of Soda, it will form an excellent laxative powder for piles.—*J. K.*

PULVIS CYPRIPEÐII COMPOSITUS. *Compound Powder of Yellow Ladies Slipper. Nerve Powder.*

Preparation.—Take of Yellow Ladies Slipper Root, Pleurisy Root, Skunk Cabbage Root, and Sculleap, of each, in powder, *one ounce*. Mix them.

Properties and Uses.—This powder is useful to allay irritability or excitability of the nervous system, to relieve spasms, and to produce sleep in restless, wakeful, or excited conditions. When acidity of the stomach is present, it is common to add Bicarbonate of Soda, an ounce. The dose is from half a drachm to a drachm three times a day, or as required; it is usually administered in tea or water.—*J. K.*

PULVIS HYDRASTIS COMPOSITUS. *Compound Powder of Golden Seal.*

Preparation.—Take of Golden Seal, Blue Cohosh, and Helonias, each, in powder, *half an ounce*. Mix together.

Properties and Uses.—This powder is tonic and antispasmodic. It will be found very efficient in dyspepsia, chronic inflammation of the mucous membrane of the stomach, and will afford much relief in cases of distress of the stomach after eating, and in aphthous inflammations of the mouth. It may also be administered to prevent a relapse, in bilious colic. The dose is from half a drachm to a drachm, three or four times a day, in water, tea, or wine, as the case may require.—*J. K.*

PULVIS HYDRASTINI COMPOSITUS. *Compound Powder of Hydrastin.*

Preparation.—Take of Hydrastin, Cornin, and Myricin, of each, *one scruple*. Mix together and divide into twenty powders.

Properties and Uses.—Stimulant, tonic, and exerting an influence on mucous membranes. It will be found useful in chronic gastritis, and some forms of dyspepsia, jaundice, etc. The dose is one powder, every two, three, or four hours, as the case may require. It will also be found an excellent tonic during convalescence from exhausting diseases.—*R. S. N.*

PULVIS IPECACUANHÆ COMPOSITUS. *Compound Powder of Ipecacuanha.*

Preparation.—Take of Pleurisy Root, Blood Root, Ipecacuanha, Nitrate of Potassa, of each, in powder, *one drachm*. Mix them.

Properties and Uses.—This powder has both diuretic and diaphoretic effects upon the system; it is useful in febrile and inflammatory diseases, and especially in cases where, from idiosyncrasy or other causes, opium is inadmissible. The dose is ten or fifteen grains every hour or two.

PULVIS IPECACUANHÆ ET OPII COMPOSITUS. *Compound Powder of Ipecacuanha and Opium. Diaphoretic Powder.*

Preparation.—Take of Opium, in powder, *half a drachm*; Camphor, in powder, *two drachms*; Ipecacuanha, in powder, *one drachm*; Bitartrate of Potassa *one ounce*. Mix them.

Properties and Uses.—This powder is a valuable anodyne and diaphoretic, and is perhaps, superior to any other preparation in its diaphoretic effects upon the system. It is of great efficacy in all febrile and inflammatory diseases, diarrhea, dysentery, cholera morbus, gout, rheumatism, after-pains, all cases of nervous irritability or excitement, and wherever an anodyne combined with a diaphoretic is required. It promotes perspiration without increasing the heat of the body. The above is the original formula, but practitioners vary in preparing it according to their favorite views; thus some omit the cream of tartar and substitute nitrate of potassa, or bicarbonate of soda, while others omit the opium, substituting in its place lactucarium, or twice the quantity of cypripedin. Dose, three to five grains every three or four hours in febrile or inflammatory diseases; and in some cases, ten grains, three times a day. Its action may be materially promoted as a diaphoretic by warm drinks, such as catnip, balm, or sage tea, lemonade,

etc., which, however, should not be given immediately after the administration of the powder, lest vomiting be provoked. In rheumatism, pneumonia, cerebral affections, hepatic disease, etc., it is frequently combined with small doses of podophyllin.

In preparing the powder, the Camphor must first be reduced to powder by trituration with a few drops of alcohol, then add a small portion of the Bitartrate of Potassa, continue the trituration until the Camphor has been still further divided, add the Opium in powder, then the Ipecacuanha, and lastly, the remainder of the Bitartrate, and triturate all together for fifteen or twenty minutes.—*N. Smith.*

PULVIS JALAPÆ COMPOSITUS. *Compound Powder of Jalap. Antibilious Physic.*

Preparation.—Take of Alexandria Senna, in powder, *two pounds*; Jalap, in powder, *one pound*; Cloves or Ginger, in powder, *two ounces*. Mix them.

Properties and Uses.—This forms an excellent purgative, useful in nearly all cases where such action is required. It combines power with mildness, and acts throughout the whole alimentary canal, cleansing it of all abnormal accumulations, and stimulating the whole biliary apparatus to healthy action. It may be given to either sex, and at all ages; and is used in all febrile, inflammatory or chronic diseases, being contraindicated in severe gastric or intestinal inflammation, and requires to be used cautiously and in moderate doses, during pregnancy, menorrhagia, and certain other diseases. Dose, one drachm, put into a gill of boiling water, and allowed to stand till cold, then sweeten if desired, stir, and drink the whole contents. Milk, wine, cider, lemonade or coffee, etc., may be substituted, in proper cases, for the water. In febrile diseases its utility will be much increased by adding about ten grains of bitartrate of potassa to each dose.

PULVIS LEPTANDRINI COMPOSITUS. *Compound Powder of Leptandrin.*

Preparation.—Take of Leptandrin, in powder, *one drachm*; Podophyllin, in powder, *half a drachm*; Sugar of milk *five drachms*. Mix, and triturate well together.

Properties and Uses.—This preparation is a cholagogue cathartic, of immense benefit in epidemic dysentery, in doses of eight grains, repeated every hour or two, until it operates freely; after which it may be given two or three times a day. It may likewise be used with advantage in typhoid, remittent, and intermittent fevers, with or without the addition of sulphate of quinia, also in all biliary derangements. The addition of three grains of *Santonin* to each dose, and given twice a day, forms an admirable anthelmintic.—*J. K.*

PULVIS LOBELIÆ COMPOSITUS.—*Compound Powder of Lobelia. Emetic Powder.*

Preparation.—Take of Lobelia, in powder, *twelve ounces*; Bloodroot and Skunk Cabbage, in powder, of each, *six ounces*; Ipecacuanha *eight ounces*; Capsicum, in powder, *two ounces*. Mix them.

Properties and Uses.—This forms an excellent emetic, and may be used in all cases where an emetic is indicated; it vomits easily and promptly, without causing cramps, or excessive prostration. The dose is two drachms, one fourth of which (half a drachm) must be given every fifteen minutes, in an infusion of boneset. Warm boneset drank freely during the time of taking it, will very much facilitate its operation; and it will also be found that, in many cases, temperate water (at 60°) will be equally as effective in assisting the induction of emesis as the infusion, and much more agreeable.—*J. K.*

PULVIS MYRICÆ COMPOSITUS. *Compound Powder of Bayberry. Cephalic Powder.*

Preparation.—Take of Bayberry Bark and Bloodroot, of each, in powder, *one ounce*. Mix them.

Properties and Uses. This powder is used either alone or combined with an equal part of common snuff, as a snuff in catarrh, headache, polypus, etc. In obstinate affections of the nasal mucous membrane, it is frequently combined with Sesquicarbonate of Potassa one or two drachms, and Golden Seal, half an ounce.

PULVIS NIGRUM. *Black Powder. Emmenagogue Powder.*

Preparation.—Take of Flowers of Sulphur, Myrrh, Steel Filings, Loaf Sugar, of each, in fine powder, *four ounces*; White Wine *two pints*. Mix together, and by means of a gentle heat, evaporate till nearly dry. Remove from the fire, and when cold, pulverize and keep in well stopped bottles.

Properties and Uses.—This compound has been used with much success in the treatment of primary or idiopathic amenorrhea, chlorosis, etc. The dose is half a drachm, to be repeated three times a day; it may be taken in syrup, or molasses, or in the form of pills. It will also be found an excellent remedy in several forms of cutaneous disease.

PULVIS PODOPHYLLI COMPOSITUS. *Compound Powder of Mandrake.*

Preparation.—Take of Blue Flag, Mandrake, Bitter Root, Swamp Milkweed, each, in powder, *one ounce*; Blood Root *half an ounce*. Mix together.

Properties and Uses.—This powder is cathartic and alterative, and is very valuable in cases of obstinate constipation, hepatic derangements, dyspepsia, worms, and in scrofulous, rheumatic, and syphilitic affections. The dose is half a drachm or a drachm, repeated three times a day; it may be administered in water or tea.—*J. K.*

PULVIS PODOPHYLLINI COMPOSITUS. *Compound Powder of Podophyllin. Hydragogue Powder.*

Preparation.—Take of Podophyllin *four grains*; Bitartrate of Potassa *three drachms*. Mix intimately together.

Properties and Uses.—This is an active hydragogue, and is frequently employed in dropsy, obstructed menstruation, etc. (It is employed in place of the old *Compound Powder of Mandrake*, which was composed of equal parts of Powdered Mandrake Root, Cream of Tartar, and Spearmint, and which was given in doses of a drachm.) Dose, one scruple; administered every two hours, until it operates sufficiently. The addition of about one or two grains of Capsicum to each dose, will render it much more speedy in its operation.

PULVIS QUINLE COMPOSITUS. *Compound Powder of Quinia.*

Preparation.—Take of Sulphate of Quinia, Ferrocyanuret of Iron, each, *one drachm*. Mix thoroughly together.

Properties and Uses.—This powder is tonic, febrifuge, and antiperiodic. It is much employed by Eclectic practitioners in febrile and inflammatory diseases, and in all diseases in which there is the least tendency to periodicity. As a tonic it is either used alone, or frequently in combination with other tonics, as hydrastin, cornin, etc. The dose is from three to six grains of the powder, repeated two, three or four times a day, according to symptoms. It was introduced to the profession as an agent in the above diseases, by Prof. I. G. Jones, of Columbus, Ohio.

PULVIS RHEI COMPOSITUS. *Compound Powder of Rhubarb. Neutralizing Powder.*

Preparation.—Take of Rhubarb, Bicarbonate of Potassa, and Peppermint Leaves, each, in powder, *one ounce*. Mix together.

Properties and Uses.—This powder is an invaluable remedy in diarrhea, cholera morbus, dysentery, summer complaint of children, acidity of stomach, heart-burn, and as a mild cathartic during pregnancy. The dose is from half a drachm to two drachms, every one, two, or three hours, as may be required. (*See Syrup of Rhubarb and Potassa.*)

PULVIS STYPTICUS. *Styptic Powder.*

Preparation.—Take of Sulphate of Iron, in powder, *two ounces*; Alum, in powder, *one ounce*. Mix them, and calcine by a red heat, as named for Red or Styptic Powder, under the head of Sesquioxide of Iron, *which see*. When cold, pulverize the mass, and keep it in well stopped bottles.

Properties and Uses.—This powder is styptic, and is frequently employed in the treatment of external hemorrhages, and bleeding piles, either alone, or in combination with stramonium ointment, poke ointment, oil of fireweed, etc. Given internally, in doses of three grains, combined with Capsicum one grain, it has proved effectual in passive hemorrhages from the lungs and uterus.

PULVIS XANTHOXYLINI COMPOSITUS. *Compound Powder of Xanthoxylon.*

Preparation.—Take of Xanthoxylon, Hydrastin, and Sulphate of Quinia, each, *one drachm*; Sugar of Milk *a sufficient quantity*. Mix together, adding just enough Sugar of Milk to form a powder, and then divide into sixty powders.

Properties and Uses.—This is a most valuable stimulating tonic, and alterative, and may be employed in all cases requiring such actions. As in debility of the digestive functions, dyspepsia, convalescence from fevers, diarrhea, and dysentery, hepatic torpor, periodical headache, scrofula, and other chronic diseases accompanied with excessive debility. The dose is one powder, to be repeated three or four times a day; it may be given in water, milk, molasses, syrup, or wine, as symptoms may indicate. One powder contains a grain, each, of xanthoxylon, quinia, and hydrastin.—*J. K.*

QUINIA.

Preparations of Quinia.

Quinia is one of our most valuable remedies, and is obtained from the Yellow Peruvian Bark; the pure Quinia is seldom used; but its Salts are more generally employed, especially those a description of which immediately follows. The *Acetate*, *Ferrocyanuret*, *Nitrate*, *Muriate*, *Lactate*, *Citrate*, *Iodide*, and *Phosphate*, have also been employed and recommended; but none of them has yet gained a standard reputation.

The *Ferrocyanuret of Quinia* is made by boiling together two parts of Sulphate of Quinia, and three of Ferrocyanuret of Potassium in a very little Water, pouring off the liquor from a greenish-yellow substance of an oily consistence which is precipitated, washing the latter with Distilled Water, then dissolving it in strong Alcohol at 100° F., filtering immediately, and afterward evaporating the solution. The *Tannate of Quinia* may be prepared by precipitating the Infusion of Bark, or Solution of Quinia, by the Infusion of Galls or Solution of Tannic Acid, and then washing and drying the precipitate. The other above named Salts of Quinia may be prepared by saturating a Solution of the Acids respectively with Quinia, and evaporating the solutions. Either of these Salts may be given in the same doses as the Sulphate. The *Iodide of Quinia* is obtained by adding a Solution of twenty-four parts of Iodide of Potassium in eight of Water, by drops, to a strong Solution of twenty parts of Bisulphate of Quinia. Wash the precipitate quickly, and dry it in the shade. It is tonic, alterative, and resolvent, and has been found of efficacy in scrofulous enlargements of the glands, in doses of from half a grain to two grains. Or it may be made by decomposing a Solution of one equivalent of Muriate of Quinia with a Solution of four equivalents of Iodide of Potassium. When dry, Iodide of Quinia thus

prepared, has the properties of a resin, is easily reduced to a white, inodorous powder, extremely bitter, and permanent in the air. It is very soluble in Water, Alcohol, or Ether, forming clear and colorless solutions, which deposit the Iodide of Quinia on evaporation. Concentrated Sulphuric and Nitric Acids, and Chlorine, decompose it instantly, with elimination of Iodine.

Off. Prep.—Ferri et Quiniæ Citras; Ferri et Quiniæ Tartras; Quiniæ Murias; Quiniæ Sulphas; Quiniæ et Morphię Tartras; Quiniæ et Salicinïæ Tartras; Quiniæ Valerianas.

QUINLE SULPHAS. *Sulphate of Quinia.*

Preparation.—Take of Yellow Calisaya Bark, in coarse powder, *four pounds*; Muriatic Acid *three fluidounces*; Lime, in powder, *five ounces*; Water *five gallons*; Sulphuric Acid, Alcohol, Animal Charcoal, each, *a sufficient quantity*. Boil the Bark in one-third of the Water, mixed with one-third of the Muriatic Acid, and strain through linen. Boil the residue twice successively, with the same quantity of Water and Acid as before, and strain. Mix the decoctions, and, while the liquor is hot, gradually add the Lime, previously mixed with two pints of Water, stirring constantly until the Quinia is completely precipitated. Wash the Precipitate with Distilled Water, and, having pressed, dried, and powdered it, digest it in Boiling Alcohol. Pour off the liquor, and repeat the digestion several times, until the Alcohol is no longer rendered bitter. Mix the liquors, and distil off the Alcohol, until a brown, viscid mass remains. Upon this substance, removed from the vessel, pour about half a gallon of Distilled Water, and, having heated the mixture to the boiling point, add as much Sulphuric Acid as may be necessary to dissolve the impure alkali. Then add an ounce and a half of Animal Charcoal, boil for two minutes, filter the liquor while hot, and set it aside to crystallize. Should the liquor, before filtration, be entirely neutral, acidulate it very slightly with Sulphuric Acid; should it, on the contrary, change the color of litmus paper to a bright red, add more Animal Charcoal. Separate the crystals from the liquor, dissolve them in Boiling Water slightly acidulated with Sulphuric Acid, add a little Animal Charcoal, filter, and set aside to crystallize. Wrap the crystals in bibulous paper, and dry them with a gentle heat. The Mother Waters may be made to yield an additional quantity of Sulphate of Quinia by precipitating the Quinia with Solution of Ammonia, and treating the precipitated alkali with Distilled Water, Sulphuric Acid, and Animal Charcoal, as before.—*U. S.*

History.—In this process the Yellow Calisaya Bark is employed in preference, on account of its containing a greater proportion of Quinia than the other barks, and holding it in combination with less Cinchonia. As found in the bark, the quinia is united with kinic acid, and very probably one or more coloring principles. As water will not take up all the

quinia of the bark, muriatic acid is added in excess, at least as far as relates to the quinia, and a soluble muriate is formed, mixed with several impurities. After the several decoctions have been mixed and filtered, lime is added, which decomposes the muriate of quinia, combining with its acid to form muriate of lime, while the quinia, being insoluble, is precipitated, leaving most of the impurities in solution with the water; any excess of lime is also thrown down with the quinia. The precipitate is next washed to separate from it all soluble impurities, and is then digested in alcohol which dissolves the quinia, and separates it from its insoluble impurities; after which, by concentration, an impure, brown, viscid quinia is obtained. This is subjected to the action of boiling distilled water, acidulated with sulphuric acid, and the officinal sulphate or disulphate of quinia is formed. The animal charcoal added at this period of the process, facilitates the crystallization of the sulphate of quinia as the solution cools, by its carbonate of lime neutralizing a portion of the sulphuric acid. The solution must not be completely neutralized, but hold the acid very slightly in excess, lest the crystallization ensue before filtration is completed. The solution and re-crystallization of the sulphate, is for the purpose of obtaining it colorless; which frequently cannot be effected until after a third solution and re-crystallization. In drying the crystals a gentle heat should be employed, that they may not effloresce. The sulphate of cinchonia remains in solution in the mother liquors.

M. Calvert states that there is no certainty in the proportion of sulphate of quinia when obtained from bark by the solvent action of muriatic acid, and the precipitant influence of lime; as a solution of chloride of lime, as well as lime-water, dissolves quinia. Consequently, all the quinia is not precipitated, especially when the lime is added in excess. To obviate this, and obtain a thorough precipitate of the quinia, he first neutralizes the excess of acid by carbonate of soda, and then precipitates by caustic soda; quinia not being soluble in this alkali. The average product of quinia obtained from calisaya bark is from one to three per cent.

By the above process, sulphate of quinia may be obtained from any of the Peruvian barks; but, with the exception of the calisaya, all the other varieties will afford a large proportion of *Sulphate of Cinchonia* held in solution by the mother waters, after the crystallization of the quinia.

Sulphate of Quinia is in the form of a loose mass of interlaced, filiform, slightly flexible, silky crystals, sometimes grouped in small stellated tufts, of a snow-white color, inodorous, and possessing a pure, most intense, bitter taste. Exposed to the air, they lose about three-fourths of their water of crystallization by efflorescence. At the temperature of 212° , they become luminous, especially when rubbed; at about 240° , they melt, presenting a waxy appearance; and at a red

heat they are charred, and gradually entirely dispersed. Sulphate of quinia requires 740 parts of water at 54° F., to dissolve it, forming an opalescent solution; and 30 parts at 212° , the latter depositing it in crystals, on cooling. It is scarcely soluble in ether, but dissolves in about sixty parts of alcohol of sp. gr. 0.835. When the water is acidulated with sulphuric acid, it dissolves much more readily. It is dissolved with facility by the diluted acids, and even oxalic and tartaric acids in excess. If to a concentrated solution of sulphate of quinia, as much sulphuric acid be added as enters into its constitution, (or an additional equivalent) a neutral sulphate of quinia is obtained by concentration and crystallization; rhombic prisms are formed, consisting of one equivalent of quinia, one of sulphuric acid, and eight of water. These are soluble in their own water of crystallization at 212° , and in eleven parts of water at 54° F.; they are also soluble in diluted, and less so in absolute alcohol. They constitute the proper sulphate of quinia, and were formerly incorrectly called *Bisulphate*, or *Supersulphate of Quinia*. The official sulphate, is a disulphate of quinia, which is the only one employed medicinally. It consists, in the form of crystals, of two equivalents of quinia 324, one of sulphuric acid 40, and eight of water $72=436$, ($2\text{NC}_{20}\text{H}_{12}$, O_2SO_3).

Sulphate of Quinia is *incompatible* with the alkalies, their carbonates, and alkaline earths which decompose it. Its aqueous solution has a peculiar blue tint by reflected light; potassa, soda, or ammonia added to it, yields a white precipitate of quinia; tannic acid, or astringent infusions containing tannic acid, furnish a white precipitate of insoluble tannate of quinia. The soluble salts of baryta and lead occasion precipitates. When a fresh solution of chlorine is added to it, and then water of ammonia, an emerald-green color is obtained, together with a gradual deposition of a green color. If a concentrated solution of ferrocyanuret of potassium be substituted for the ammonia, a dark-red color is produced, which after several hours, gradually becomes converted into a green. A solution of cinchonia is not thus acted upon.

The high price of Sulphate of Quinia has led to various adulterations. The most common of which are: the fraudulent additions of sugar, sulphate of lime, mannite, starch, stearin, margarin, caffen, salicin, sulphate of cinchonia, etc. Sulphate of cinchonia may be detected as follows, even in the smallest quantity: Take 38 grains of the suspected sulphate of quinia, and introduce it into a flask with half an ounce of solution of ammonia; agitate them well, and allow the mixture to repose twenty-four hours. Then by means of a water-bath, heat it, until the excess of ammonia has been almost completely driven off; allow it to cool, and add one ounce of pure ether. By agitation the quinia is quickly and completely dissolved, and by rest the contents of the flask consists of two transparent liquids, the lower containing sulphate of ammonia, the upper quinia dissolved in ether, if the salt be pure; but

if it contain sulphate of cinchonia, there will be an intermediate stratum between the two liquids of insoluble cinchonia. *Sulphate of Cinchonia* is best detected by dissolving the salt in forty parts of boiling water, which on cooling will deposit most of the sulphate of quinia, but retain most of the salt of cinchonia—and by concentrating the residual solution, the latter is obtained in short rhombic prisms, or pearly scales—forms which are never assumed by sulphate of quinia.

Many of the above adulterations may be ascertained by remarking the degree of solubility of the sulphate in different menstrua, as well as its chemical actions with substances above described. Sulphate of quinia is entirely dissipated by exposure to a red-heat, and if any substance remains behind it is sulphate of lime, or some mineral substance. Fatty matters, when present, are not wholly soluble in acidulated water; starch and gum are not dissolved by alcohol. Sugar, or mannite, may be known by the sweet taste imparted to the residuum remaining after evaporation of the watery solution,—this having been, previous to its evaporation, deprived of its quinia by precipitation with an alkaline carbonate and filtration. *Salicin* is discovered by cold concentrated sulphuric acid forming with the suspected salt a red instead of a colorless solution. If this acid solution is brown or black, it indicates starch, sugar, fatty matters, or other organic substances. Pelletier states that unless the salicin exceeds one-tenth of the amount, this change of color does not ensue; and consequently when less than this proportion, the salicin must be separated as follows: Add six parts of concentrated sulphuric acid to one part of the suspected salt, and to the resulting brown liquid, add 125 parts of water. The salicin separates, and by filtration may be obtained in the form of a white bitter powder, which becomes bright-red by contact with sulphuric acid. Caffein is difficult to detect, though it changes the solubility of the salt in different menstrua. A volatile ammoniacal salt may be known by the ammoniacal odor evolved upon the addition of potassa. The purity of sulphate of quinia may be determined by the following method of the Edinburgh College: “A solution of ten grains in a fluidounce of distilled water and two or three drops of sulphuric acid, if decomposed by a solution of half an ounce of carbonate of soda in two waters (twice its weight of water), and heated till the precipitate shrinks and fuses, yields on cooling a solid mass, which when dry weighs 7.4 grains, and in powder dissolves entirely in solution of oxalic acid.” Christison states that though this test is sufficient for most impurities, it will not answer where the adulteration is caffein or sulphate of cinchonia. He also gives the following convenient test for determining its purity: “Twenty parts of boiling water acidulated with sulphuric acid dissolve it entirely and without any floating oily globules appearing, if there be no fatty matter present; the solution when cold, does not become blue with tincture of iodine if free of starch; it does not precipitate with oxalic acid if free of lime; and

when treated with solution of baryta so long as a precipitate forms, which precipitate is a mixture of quinia and sulphate of baryta, the liquid has not a sweet taste, if free of sugar or mannite."

Properties and Uses.—Sulphate of Quinia is febrifuge, tonic, and antiperiodic. Small doses frequently repeated, strengthen the pulse, increase muscular force, and invigorate the tone of the nervous system. In some persons it induces headache, sickness, or irregular action of the bowels—which effects are generally obviated by combining it with morphia, extract of stramonium, or both; and these effects will be almost certain to follow if gastro-enteric irritation pre-exists. Large doses, as one scruple, or half a drachm, produce many unpleasant symptoms, and ought never to be used; among these may be named sickness and pain at the stomach, giddiness, flushed countenance, palpitation, a sense of distension in the head, intense weighty headache, ringing in the ears, vomiting, numbness in the feet, deafness, blindness, and delirium. The evil results following large doses, or the injudicious administration of quinia has caused many physicians to reject it altogether, in their practice. This is wrong. Quinia is a safe and very superior remedy, in proper hands. As well might we reject all active and useful agents, because, when improperly used, they produce deleterious consequences. Again, the quinia, especially that imported into this Western Country for many years past, has been much adulterated with agents calculated to cause the mischief attributed to the salt; and, it must also be remembered, that many of the symptoms following the use of quinia, are the legitimate results of disease itself, as an enlarged spleen, a deranged condition of the nervous system, etc., or are the deplorable consequences of a combined mercurial treatment, which has been and still continues to be a fashionable practice in many portions of this section of the country. No sensible or well educated physician will ever object to the proper employment of the pure sulphate of quinia.

With many patients, the beneficial influence of this agent will not be observed until Cinchonism has been produced, known by giddiness, a buzzing or ringing in the ears, slight headache, etc.; while with others it produces good effects independent of the production of these symptoms. When taken internally it is absorbed, and may be detected in the sweat and urine.

Sulphate of Quinia in Eclectic practice is used in all febrile diseases, without regard to the violence of the fever, or the degree of congestive enlargement of the liver or spleen; it is usually given during the intermissions or remissions, and in doses sufficient to affect the head, each day,—when for that day its administration is omitted; but should there be no apparent remissions, it is then given daily to produce the same influence upon the head, without, as before said, regard to the violence of the fever, etc. Previous to its administration, however, any symp-

toms of irritability, wakefulness, or restlessness, must first be subdued. It is frequently given in these cases, as well as in many other forms of disease, in combination with ferrocyanuret of iron; and was first introduced to the profession, as a safe and efficacious remedy in this class of maladies by Prof. I. G. Jones. In typhus and typhoid fever, it will be found of much service, in conjunction with small doses of Leptandrin or Podophyllin, sufficient to produce a daily alvine evacuation. In febrile relapses, acute rheumatism, neuralgia, dyspepsia, debility, convalescence from most acute and chronic diseases, dysentery, and in all epidemic diseases, and every disease characterized by periodicity, it may be given with every expectation of success. Combined with morphia, I have used it successfully in epilepsy, delirium tremens, and the convulsive diseases of intemperate persons. In dysmenorrhea, in conjunction with extract of stramonium or belladonna, and cimicifugin, it proves almost a specific. It is generally contra-indicated during the presence of gastric inflammation, or unusual irritation of the stomach; though the addition of morphia, in such cases, will sometimes prevent any hurtful consequences.

As a tonic, sulphate of quinia will be found useful in all diseases connected with an enfeebled state of the system, and especially in the debility resulting from exhausting diseases; in chlorosis, and in anemic conditions it should be given in union with chalybeates. Externally, sulphate of quinia in solution, has formed a valuable application to indolent ulcers, buboes, chancres, and chronic mucous inflammations. The dose of it internally, is from half a grain to three grains, repeated every one, two, three, or four hours, as the urgency of the case may require. Large doses are improper.

A solution of Sulphate of Quinia may be made by adding twenty grains of the salt to one fluidrachm of Elixir of Vitriol, and when dissolved, add two fluidounces of water. The dose of this solution is twenty drops every hour, in about half an ounce of water, or syrup of ginger. Another solution may be made by dissolving Sulphate of Quinia, Tartaric Acid, of each, twenty grains, in two fluidounces of Water. The dose is as above. The acetate, nitrate, phosphate, ferrocyanate, citrate and muriate of quinia, possess similar properties, but are not usually preferred in practice.

Off. Prep.—*Pilulæ Quiniæ Sulphatis*; *Pilulæ Quiniæ Compositæ*; *Pilulæ Valerianæ Compositæ*; *Pulvis Quiniæ Compositus*; *Pulvis Xanthoxylini Compositus*; *Tinctura Quiniæ Composita*.

QUINIA ET MORPHIA TARTRAS. *Tartrate of Quinia and Morphia.*

Preparation.—Take of pure crystallized Tartaric Acid, dried, *one hundred and fifty-six grains*; pure Quinia *one hundred and sixty-two grains*; pure Morphia *two hundred and ninety-two grains*; Water *a sufficient quantity*. Add the Acid and the Alkalies to the Water, and boil

together. When the whole is dissolved, evaporate at a low temperature, till the Solution is of the consistence of thick syrup, then spread it in layers on glass or porcelain plates, and dry in the shade.

History.—This valuable, non-crystallizable, double-alkaloidal salt is the discovery of my former colleague, Prof. J. Milton Sanders. It is obtained in beautiful transparent scales or plates, holding each alkaloid in its equivalent proportion. It is inodorous, having a slightly bitter taste, and is very soluble in water.

Properties and Uses.—Tartrate of Quinia and Morphia is a sedative, tonic, and febrifuge, and is useful in all febrile diseases, especially where there is great irritability or excitability of the nervous system, restlessness, watchfulness, etc.; also in delirium tremens, periodic spasmodic diseases, epilepsy, and wherever a sedative tonic effect is desired. The dose is from a fourth of a grain to a grain, every one, two, or four hours, as the urgency of the case may require.

QUINIA ET SALICINIA TARTRAS. *Tartrate of Quinia and Salicin.*

Preparation.—Take of pure Salicin *four hundred and fifty-seven grains*; Tartaric Acid, crystallized and dried, *one hundred and fifty-six grains*; pure Quinia *one hundred and sixty-two grains*; Water *a sufficient quantity*. Add the Alkaloids to the Water, and boil together, until they are dissolved. Evaporate the solution at a low temperature, till it is of the consistence of thick syrup; then spread it in layers on glass or porcelain plates, and dry in the shade.

History.—This non-crystallizable, double-alkaloidal salt is likewise the discovery of Prof. J. Milton Sanders. It is, like the previous salt, obtained in scales or pellicles, inodorous, bitter, and possessing in a high degree the activity of both its constituent alkaloids. It is soluble in water.

Properties and Uses.—Tartrate of Quinia and Salicin is a febrifuge, tonic, and antiperiodic. It possesses an activity which does not belong to its isolated salts, and may be used in all those cases where either quinia or salicin would be indicated. The dose is from one to five grains, every one, two, or four hours.

N. B. Professor Sanders has also prepared the corresponding *citrates* of the above salts, as well as the *Ferrocitrates of Quinia, Morphia, and Salicine*; prepared by substituting citric acid for the tartaric, and which may be substituted for the corresponding tartrates, if desired, in the same doses, and forms of disease.

QUINIA VALERIANAS. *Valerianate of Quinia.*

Preparation.—Take of Muriate of Quinia *seven drachms* (Dublin weight); Valerianate of Soda *one hundred and twenty-four grains*; Distilled Water *sixteen fluidounces*. Dissolve the Valerianate of Soda in two ounces of the Water, and the Muriate of Quinia in the remainder, and,

the temperature of each solution being raised to 120° , but not higher, let them be mixed, and let the mixture be set by for twenty-four hours, when the Valerianate of Quinia will have become a mass of silky acicular crystals. Let these be pressed between folds of blotting paper, and dried without the application of artificial heat.—*Dub.*

History.—In this process a double decomposition takes place between the two salts, producing a solution of chloride of sodium, and crystals of valerianate of quinia. This salt may also be made by either of the following methods: Add a slight excess of Valerianic Acid to a Concentrated Solution of Quinia, in strong Alcohol; dilute the solution with twice its weight of Water, stir the mixture accurately, and evaporate at a temperature not exceeding 122° F. After the evaporation of the Alcohol, the Valerianate appears in fine crystals, sometimes isolated, at others grouped together, and which increase from day to day. Or it may be procured by double decomposition of Sulphate of Quinia and Valerianate of Lime, each dissolved in weak Alcohol, and then evaporated.

Valerianate of Quinia is in white, acicular crystals, having a powerful, repulsive odor of valerianic acid, which is quite distinct from that of oil of valerian. It is soluble in cold water, and more readily in hot, being deposited in fine crystals on cooling. In boiling water it fuses into oily globules, and becomes decomposed with dissipation of its valerianic acid; its solution should not be heated above 120° . Alcohol dissolves it. It appears to lose its strength gradually on exposure to the air; and is easily decomposed by mineral and other acids.

Properties and Uses.—Valerianate of Quinia is tonic, febrifuge, and sedative, and may be employed similarly with the tartrate of quinia and morphia. It is highly recommended by Prof. I. G. Jones in hemicrania, and in febrile or other diseases, to relieve restlessness, wakefulness, or nervous irritability. The dose is from half a grain to two grains, every two, three, or four hours, according to the nature of the case.

Off. Prep.—*Pilulæ Cimicifugæ Compositæ.*

SODA.

Preparations of Soda.

SODÆ BICARBONAS. Bicarbonate of Soda.

Preparation.—Take of Carbonate of Soda, in crystals, a convenient quantity; break the crystals in pieces, and put them into a wooden box, having a transverse partition near the bottom, pierced with numerous small holes, and a cover which can be tightly fitted on. To a bottle having two tubulures, and half filled with water, adapt two tubes, one connected with an apparatus for generating carbonic acid, and terminating under the water in a bottle, the other commencing at the tubulure,

in which it is inserted, and entering the box by an opening near the bottom, beneath the partition. Then lute all the joints, and cause a stream of carbonic acid to pass through the water into the box, until the carbonate of soda is fully saturated.—Carbonic acid is obtained from marble, by the addition of Dilute Sulphuric acid.—*U. S.*

History.—In this process, the crystals of Carbonate of Soda, placed on a perforated diaphragm, are exposed to the action of carbonic acid. During the progress of the operation, a considerable amount of water is set free, in consequence of the bicarbonate combining with less water of crystallization than the carbonate; hence the necessity of the diaphragm to allow the water to drain off, instead of dissolving the bicarbonate. When the process is finished, the crystals on the diaphragm will still retain their form, but become changed into an opake and porous substance. There are several other methods of preparing this salt, which it is unnecessary to relate here.

Bicarbonate of Soda, according to its mode of preparation, is in small, white, opake, irregular scales, or, in minute, colorless, indistinct crystals, or, when prepared by the above formula, in opake, porous masses, of a snow-white color, and composed of numerous, aggregated, crystalline grains. It is permanent in the air, and possesses a saline, slightly alkaline, not unpleasant taste. It is soluble in thirteen parts of temperate water, and in much less at 212° , from the latter of which, it is obtained in minute, hard, white grains, composed of radiated fibers, as it slowly cools. When its solution is heated a little above 120° , carbonic acid gradually passes off from the salt, which becomes converted into sesqui carbonate at 212° . At a red-heat it is converted into an anhydrous carbonate, its water of crystallization, and an equivalent of carbonic acid being expelled. Bicarbonate of soda consists of one equivalent of soda 31.3, two of acid 44.24, and one of water 9=84.54.

Bicarbonate of soda is seldom adulterated, its principal impurity being the result of faulty preparation; in consequence of which, probably arising from imperfect saturation with carbonic acid, a greater or less proportion of carbonate of soda is found with it. The presence of the carbonate may be known by the decided alkaline and disagreeable taste imparted; by the solution yielding a white precipitate with sulphate of magnesia; and by a solution in forty parts of water, giving a reddish-brown precipitate with corrosive sublimate, even if only one per cent. of the carbonate be present,—this test causes a slight opalescence only with the pure bicarbonate. When a solution of bicarbonate of soda is not precipitated by chloride of platinum, or when, after supersaturation with nitric acid, no precipitate is occasioned by chloride of barium or nitrate of silver, it shows the absence of potassa salts, and of sulphates and chlorides. Bicarbonate of soda is *incompatible* with acids, acidulous salts, lime-water, muriate of ammonia, and earthy and metallic salts. Sulphate of magnesia does not decompose it.

Properties and Uses.—Bicarbonate of Soda possesses properties similar to the bicarbonate of potassa, though less actively diuretic; it also resembles the carbonate of soda in its action, but is much less irritating, and milder to the taste. It is an excellent antacid and antilithic; and has been used in calculous diseases with predominance of uric acid. When the carbonate of soda is given in these cases, its continued use is liable to induce phosphatic deposits, after the removal of the uric acid, which is not the case with the bicarbonate, especially when taken in carbonic acid water, which has the power of maintaining the phosphates in solution, even after it has caused the uric acid to disappear. The same remark is applicable to the bicarbonate of potassa. In doses of a grain, dissolved in milk and water, and repeated every five minutes, the bicarbonate of soda has been used, with apparent advantage, in infantile croup, promoting the expectoration of the false membrane. The dose of this salt for an adult is, from ten to sixty grains, in a glass of carbonic acid water, or common soda water. *Soda Powders*, or *Effervescing Powders* are prepared by placing in one paper Tartaric Acid, twenty-five grains; and in another Bicarbonate of Soda thirty grains. When to be used, they are dissolved in separate portions of water, to which some aromatic syrup may be added, and then mixed. Effervescence immediately ensues, during which the liquid is to be drank. It forms a refrigerant and slightly laxative draught, which is very agreeable and refreshing, especially to persons with fever. The effervescence is occasioned by the escape of carbonic acid, which is set free from the bicarbonate by the tartaric acid, which unites with the soda, forming a tartrate of soda.

The *Yeast or Baking Powders*, which are now sold so extensively throughout the country, are composed of 54.7 parts of crystallized bitartrate of potassa, in powder; 22.7 parts of soda-salæratum, a salt between the carbonate and bicarbonate, as regards its proportion of carbonic acid; and 22.7 parts of starch, of which corn starch is the best. A good baking powder may be made of two and a half parts of bitartrate of potassa, and one part, each, of bicarbonate of soda and starch.

SODÆ CARBONAS EXSICCATUS. Dried Carbonate of Soda.

Preparation.—Take of Carbonate of Soda a convenient quantity. Expose it to heat, in a clean iron vessel, until it is thoroughly dried, stirring constantly with an iron spatula; then rub it into powder.—*U. S.*

History.—Carbonate of Soda consists of one equivalent of base, one of acid, and ten of water; at a moderate heat it undergoes the watery fusion, and a higher heat drives off all the water and leaves a white, opake, porous, anhydrous carbonate, which is easily pulverizable. It consists of one equivalent of base, one of acid, and no water of crystallization, $\text{Na O} + \text{CO}_2$. Dilute sulphuric acid decomposes it, disengaging 40.7 per cent. of carbonic acid.

Properties and Uses.—Dried or Anhydrous Carbonate of Soda possesses properties similar to the crystallized carbonate. It is antacid and antilithic, and has been highly extolled in calculous affections depending on a morbid secretion of uric acid. Being free from any water of crystallization it readily admits of being made into pills; from a similar cause its dose is less than the crystallized salt. From five to fifteen grains may be administered for a dose, and repeated three times a day; it is best given in the form of pill with soap and aromatics.

Off. Prep.—Sodæ Bicarbonas.

SODÆ ET POTASSÆ TARTRAS. *Tartrate of Potassa and Soda. Tartarized Soda. Rochelle Salt.*

Preparation.—Take of Carbonate of Soda *a pound*; Bitartrate of Potassa *sixteen ounces*; Boiling Water *five pints*. Dissolve the Carbonate of Soda in the Water, and gradually add the Bitartrate of Potassa. Filter the solution, and evaporate until a pellicle forms; then set it aside to crystallize. Pour off the liquor, and dry the crystals on bibulous paper. Lastly, again evaporate the liquor that it may furnish more crystals.—*U. S.*

History.—This salt was discovered by Seignette, an apothecary of Rochelle in 1672, but the mode of preparing it was not made known until in 1731 by Geoffroy. It is a double salt consisting of tartrate of soda combined with tartrate of potassa. It has been prepared in various ways, but is at present made by neutralizing bitartrate of potassa with carbonate of soda; the excess of tartaric acid in the bitartrate is saturated by the carbonate of soda, carbonic acid being given off at the same time, with effervescence.

Tartrate of potassa and soda is in the form of beautiful, colorless, and nearly transparent crystals, frequently very large, and having the shape of prisms or half prisms, with six, eight, or ten sides; their primitive form is the right rhombic prism. It is permanent in the air, with the exception of a slight efflorescence in very dry air, has a mild, saline, slightly bitter, not disagreeable taste, dissolves in five times its weight of cold, and in much less boiling water, and its solution is neutral to test-paper. Heat causes it to fuse in its water of crystallization, and when increased decomposes it, destroying the tartaric acid, and leaving a mixture of its two alkaline bases in the form of carbonates, with charcoal. Chloride of barium, or a weak solution of nitrate of silver added to its solution, occasions no precipitate, unless sulphates or chlorides are present. It is *incompatible* with most acids, acidulous salts, except the bitartrate of potassa, acetate and subacetate of lead, the soluble salts of lime and of baryta. Acids decompose it by uniting with the soda, and causing a crystalline precipitate of bitartrate of potassa. It consists of one equivalent of tartrate of potassa 113.2, one of tartrate of soda 97.3, and eight of water $72=282.5$. Or, two equivalents of tartaric acid 132, one of

potassa 47.2, one of soda 31.3, and eight of water $72=282.5$ ($2\overline{T}+KO+Na\ O+8\ Aq$). It is not subject to adulteration.

Properties and Uses.—Tartrate of Potassa and Soda is a mild, cooling purgative, and being more agreeable than most neutral salts, it is especially adapted to those whose stomachs are delicate or irritable. The dose is from two drachms to one ounce, dissolved in eight or ten parts of water. Given in small doses, and frequently repeated, it is absorbed, and instead of purging, produces alkalinity of the urine. Two drachms of tartrate of potassa and soda added to two scruples of bicarbonate of soda, and put up in one (blue) paper, and thirty-five grains of tartaric acid placed in the other (white) paper, forms the gentle aperient known as *Seidlitz Powder*. Dissolve the contents of each paper, separately, in half a tumbler of water, mix the two solutions, and drink immediately while it is effervescing.

SODÆ PHOSPHAS. Phosphate of Soda.

Preparation.—Take of Bone, burnt to whiteness and powdered, *ten pounds*; Sulphuric Acid *six pounds*; Carbonate of Soda *a sufficient quantity*. Mix the powdered Bone with the Sulphuric Acid in an earthen vessel; then add a gallon of Water, and stir them well together. Digest for three days, occasionally adding a little Water to replace that which is lost by evaporation, and frequently stirring the mixture. At the expiration of this time, pour in a gallon of Boiling Water, and strain through linen, gradually adding more Boiling Water, until the liquid passes nearly tasteless. Set by the strained liquor, that the dregs may subside, from which pour off the clear Solution, and boil it down to a gallon. To this solution, poured off from the dregs, and heated in an iron vessel, add, by degrees, the Carbonate of Soda previously dissolved in Hot Water, until effervescence ceases, and the phosphoric acid is completely neutralized; then filter the liquor, and set it aside to crystallize. Having removed the Crystals, add to the liquor, if necessary, a small quantity of Carbonate of Soda, so as to render it slightly alkaline. Then alternately evaporate and crystallize, so long as any crystals are produced. Lastly, preserve the crystals in a well stopped bottle.—*U. S.*

History.—Bones are composed chiefly of carbonate of lime, gelatin, and phosphate of lime, and when burnt at a full red-heat, the gelatin is decomposed, its carbon becomes gradually consumed, and a white substance called bone-phosphate is left, consisting of phosphate of lime and a small proportion of carbonate, etc. When this bone-phosphate is well pulverized, and subjected to the action of sulphuric acid, decomposition of the carbonate of lime, with effervescence, takes place. The phosphate of lime becomes partially decomposed, phosphoric acid is set free, and all the lime detached from the two salts, combines with the sulphuric acid, forming a precipitate of sulphate of lime. The disengaged phosphoric acid unites with that portion of the phosphate of lime which has

not been decomposed, and a solution of the superphosphate of lime is the result. Boiling water is now added for the purpose of separating any sulphate of lime which may remain in the solution, and the whole is strained; the sulphate, which remains on the strainer, is washed as long as it yields any superphosphate, which may be known by the acid taste of the water passed. The washings and strained solution of superphosphate of lime, being mixed together, and allowed to rest, a portion of sulphate of lime is precipitated as the liquid cools, and from which it is separated by decantation. The liquid is, then concentrated by evaporation, which causes a still further deposit of sulphate of lime, which is separated by rest and decantation as before. The concentrated solution of superphosphate of lime is now heated, and a hot solution of carbonate of soda added to saturation. The excess of phosphoric acid in the solution combines with the soda to form phosphate of soda, while the carbonic acid is set free with effervescence; the superphosphate of lime having lost its excess of acid, is precipitated as the neutral phosphate. The liquid being a solution of phosphate of soda, is now filtered to separate the neutral phosphate of lime, after which it is evaporated and allowed to crystallize. In order to insure a complete precipitation of the neutral phosphate, as well as an entire disengagement of the carbonic acid, both solutions, when added together, should be boiling hot; and if the solution of phosphate of soda thus procured, be slightly alkaline, the crystals will form more abundantly and with greater facility.

An economical and expeditious mode for obtaining phosphate of soda, has been given by M. Funcke, a German chemist. It consists in diffusing the powdered bone-phosphate in water, adding enough dilute sulphuric acid to decompose the whole of its carbonate of lime, and when effervescence has ceased, to add nitric acid, which dissolves the phosphate of lime, and leaves the sulphate. To this nitric solution, sulphate of soda, equal in quantity to the bone employed, is added, and when reaction ceases, the nitric acid may be recovered by distillation. By this process, sulphate of lime and phosphate of soda are generated, which may be separated from each other by the action of water, and the phosphate crystallized in the ordinary manner. Phosphate of soda crystallizes in rhombic prisms terminated by four converging planes; the crystals are large, colorless, and transparent, but soon become opaque on account of their speedy efflorescence in the air. They have a cooling, mildly-saline taste, somewhat like that of common salt, and have a slight alkaline reaction. Heat fuses them in their water of crystallization, and if continued the water passes off, leaving only one equivalent of water, which is obstinately retained by every two equivalents of soda. At a red-heat, all the water is expelled, and the salt melts into a limpid globule, which becomes opaque on cooling; in this form it is the pyrophosphate of soda of Clark, or the diphosphate of Turner. Phosphate of soda is soluble in four parts of cold, and two of boiling water. It is

not apt to be adulterated, but may contain carbonate of soda, from an excess being added during the process, and which may be known by the effervescence occurring on the addition of an acid. If any soluble sulphate be present, chloride of barium will precipitate a mixture of sulphate and phosphate of baryta, and which nitric acid will not wholly dissolve; if the precipitate dissolves in nitric acid with effervescence, it is a carbonate of baryta, caused by the presence of carbonate of soda. Nitrate of silver will produce a yellow precipitate if a chloride be present, and which precipitate is a mixture of chloride and phosphate of silver, not entirely soluble in nitric acid. Phosphate of soda is *incompatible* with the soluble salts of lime, which precipitate phosphate of lime, with the magnesian salts, and with neutral metallic solutions. It consists of two equivalents of soda 62.6, one of phosphoric acid 72, and twenty-five of water $225 = 359.6$. ($2 \text{ Na O} + \text{PO}_5 + 25 \text{ HO}$). If a solution of phosphate of soda be evaporated at 90° , the salt crystallizes with only fifteen, instead of twenty-five equivalents of water.

Properties and Uses.—Phosphate of Soda, formerly known as *Subphosphate of Soda*, and *Sal Mirabile*, is a mild, saline cathartic, well adapted to children, and persons with delicate stomachs. The dose is from half an ounce to two ounces, and is best given in gruel or weak broth, to which it imparts a taste as if seasoned with common salt.

Off. Prep.—Ferri Phosphas.

SODÆ VALERIANAS. *Valerianate of Soda.*

Preparation.—Take of Bichromate of Potassa, in powder, *nine ounces*, (Avoirdupois); Fusel Oil *four fluidounces*, (Imperial measure); Commercial Oil of Vitriol *six fluidounces and a half*, (Imp. meas.); Water *half a gallon*, (Imp. meas.); Solution of Caustic Soda *one pint*, (Imp. meas.), or *as much as is sufficient*. Dilute the Oil of Vitriol with ten fluidounces of Water, and dissolve the Bichromate of Potassa, in the remainder of the Water, with the aid of heat. When both the Solutions have cooled down to nearly the temperature of the atmosphere, place them in a matrass, and having added the Fusel Oil, mix well by repeated shaking, until the temperature of the mixture, which at first rises to 150° , has fallen to 80° or 90° . The matrass having been now connected with a condenser, heat is to be applied so as to distil over about half a gallon of liquid. Let this, when exactly saturated with Solution of Caustic Soda, be separated from a little Oil that floats upon its surface, and evaporated down until the escape of Aqueous Vapor having entirely ceased, the residual salt is partially liquefied. Now withdraw the heat, and when the Valerianate of Soda has concreted, it is, while still warm, to be divided into fragments, and preserved in a well stopped bottle.—*Dub.*

History.—In this process, Valerianic Acid is formed by the oxidizing action of chromic acid, or of the sulphuric acid and bichromate, on the

fusel oil, and passes over with water; the solution of caustic soda being then added to it to saturation forms a solution of valerianate of soda, which is obtained in the solid form by evaporation. The oil that floats on the surface of the solution of the valerianate, is valerianate of amyllic ether. Fusel oil is converted into valerianic acid by being deprived of two equivalents of hydrogen, while at the same time it gains two of oxygen. Valerianate of soda is a deliquescent salt, having, at first, a styptic taste followed by sweetishness, a valerian odor, and is very soluble in water. It fuses without loss of acid at 285° , and on cooling, becomes a white solid; it consists of one equivalent of soda 31.3, and one of acid $93=124.3$ (Na O , $\text{C}_{10} \text{H}_9 \text{O}_3$).

Properties and Uses.—Valerianate of Soda is not used as a medicine, but for the preparation of the valerianates of iron, quinia, etc., by double decomposition of the soda salt with salts of the respective bases. It might be used with advantage in nervous and irritable habits, attended with acidity of the stomach.

Off. Prep.—Quiniæ Valerianas.

STRYCHNIA.

Strychnia.

Preparation.—Take of Nux Vomica, rasped, *four pounds*; Lime, in powder, *six ounces*; Muriatic Acid *three fluidounces*; Alcohol, Diluted Sulphuric Acid, Solution of Ammonia, Purified Animal Charcoal, Water, of each, *a sufficient quantity*. Digest the Nux Vomica in two gallons of Water, acidulated with a fluidounce of the Muriatic Acid, for twenty-four hours; then boil for two hours, and strain with expression through a strong linen bag. Boil the residuum twice successively in the same quantity of Acidulated Water, each time straining as before. Mix the decoctions and evaporate to the consistence of thin syrup; then add the Lime previously mixed with a pint of Water, and boil for ten minutes, frequently stirring. Pour the mixture into a double linen bag, and, having washed the precipitate well with Water, press, dry, and powder it. Treat the Powder repeatedly with Boiling Alcohol, until deprived of its bitterness; mix the liquors, and distil off the Alcohol by means of a water-bath. Mix the residue with Water, and, having applied heat, drop in sufficient Diluted Sulphuric Acid to neutralize and dissolve the Strychnia; then add purified Animal Charcoal, boil for a few minutes, filter, evaporate, and crystallize. Dissolve the crystals in Water, and add sufficient Solution of Ammonia to precipitate the Strychnia. Lastly, dry the precipitate on bibulous paper.—*U. S.*

History.—In the above process the nux vomica is first reduced to a powder in order to be more readily acted upon, and this may be done

by rasping the seeds, or by exposing them to steam until softened, and then slicing, drying, and grinding them. The strychnia is then extracted by water acidulated with muriatic acid, which forms a solution of muriate of strychnia. This is concentrated, and on the addition of lime the salt is decomposed,—an impure strychnia is precipitated, while the chloride of calcium remains in solution. The precipitate is treated with boiling alcohol which takes up the strychnia, and which may be obtained in impure and colored crystals, by concentration of the alcoholic solution. To purify it, sulphuric acid is added to the crystals forming a sulphate of strychnia, while at the same time animal charcoal is employed to decolorize it. In the last part of the process ammonia is added to the sulphate of strychnia, which decomposes it, precipitating crystals of strychnia, while the sulphate of ammonia remains in solution. The brucia of the *nux vomica*, accompanies the strychnia throughout the process, and remains in the solution only when the strychnia is obtained from the alcoholic solution. As brucia is more readily soluble in cold alcohol than strychnia, it would be an improvement upon the above process, to continue the purification by two or more solutions, and crystallizations in alcohol. Or if it be desired to remove the brucia almost entirely, the strychnia obtained may be dissolved in very diluted nitric acid, then filtered and concentrated for crystallization. The nitrate of brucia forms short, thick, dense prismatic crystals, grouped together, and the nitrate of strychnia crystallizes in radiated tufts of long, light, silky, capillary needles. On adding water to these, and gently agitating, the strychnia may be poured off, leaving the brucia. The salts may then be dissolved, separately, in water, and decomposed by ammonia. Strychnia is obtained in great proportion from St. Ignatius' Bean, but on account of its scarcity, the *nux vomica* seeds are employed. It is also stated that it may be profitably procured from the bark of the *nux vomica* tree.

Strychnia crystallizes in elongated, oblique, colorless octaëdres, or quadrilateral prisms with quadrilateral terminations; when rapidly crystallized from the alcoholic solution, it is in the form of a white, granular powder. It is inodorous, with an intense bitterness which may be communicated to water containing only a 600,000th part of it, is permanent in the air, fusible like a resin, and is completely dissipated by a red-heat. It is soluble in fixed and volatile oils, in 6667 parts of water at 50°, in 2000 at 212°, and in boiling alcohol; it is insoluble in ether or pure alcohol, and is alkaline in its reactions. The strychnia usually met with is in the form of a grayish-white powder. Strychnia consists of carbon, hydrogen, oxygen, and nitrogen, the proportions of which have been variously given; Liebig and Gerhardt define its composition to be $C_{14} H_{24} O_4 N_2$.

If brucia be present in strychnia, the addition of nitric acid reddens it. A concentrated solution of pure strychnia in concentrated sulphuric acid,

becomes of a splendid violet color on the addition of a minute quantity of solution of chromate of potassa. Strychnia may be detected in very minute quantity, by placing a drop of the suspected liquid on glass, and allowing the liquor to evaporate, then to the dry residuum add a drop of concentrated sulphuric acid, or enough to moisten it, and then add a drop of solution of ferrocyanide of potassium (red prussiate of potassa), and mix well together; a fine deep violet color will be immediately produced, which passes slowly into a light brick-red color, and remains for several hours. It may likewise be detected in minute quantity, by rubbing a little of the alkali with a few drops of concentrated sulphuric acid containing one-hundredth of nitric acid,—the solution will be without color; but if peroxide of lead be added in the smallest quantity, a magnificent blue color will be at once produced, and which will pass rapidly into violet, then gradually to red, and finally into yellow.

Brucia may be obtained from false angustura bark, by a similar process to that of procuring strychnia from nux vomica, with the exception that the alcoholic extract of the precipitate occasioned by lime or magnesia, should be treated with oxalic acid, and then with a mixture of rectified alcohol and ether, which takes up the coloring matter, and leaves the oxalate of brucia. This is decomposed by magnesia, and the brucia separated by alcohol, and obtained in crystals by spontaneous evaporation. Brucia crystallizes in small, delicate, pearly, colorless scales, is inodorous, intensely bitter, permanent in the air, and fusible a little above 212° . It is soluble in alcohol, in 850 parts of cold and 500 of boiling water, sparingly soluble in volatile oils, and insoluble in ether and the fixed oils. It has an alkaline reaction, and like strychnia forms crystallizable salts with acids. Nitric acid reddens it, which becomes yellow by heat, and violet upon the addition of protochloride of tin.

Prof. J. Milton Sanders has prepared two salts of strychnia, the citrate and tartrate, which he considers the most efficient form of administration, and as possessing more activity and safety than the pure strychnia. He prepares the *Citrate of Strychnia* by dissolving with a gentle heat in a sufficient quantity of distilled water, one hundred and ninety-two grains of dried citric acid, and then adding three hundred and forty-six grains of pure strychnia. By gentle evaporation the citrate may be obtained in crystals. It is an acid salt, and its constitution is $(C_{12}H_5O_{11} + H^2) + (C_{44}H_{22}N_2O_4)$. That is, one equivalent of the strychnia has displaced one equivalent of the external hydrogen of the citric acid. As it is a tribasic acid, there are still two equivalents of external hydrogen to be displaced, ere the acid be entirely neutralized. The dose is from one-tenth to one-twentieth of a grain, to be given cautiously till the desired effect is produced.

The *Tartrate of Strychnia* he obtains, by dissolving in a sufficient quantity of Distilled Water, one hundred and fifty-six grains of Tartaric Acid, and then adding three hundred and forty-six grains of Strychnia.

and evaporating as above. It is also an acid salt with the composition indicated by the formula $(\text{Cs H}^4 \text{O}_{10} + \text{H}) + (\text{C}_{44} \text{H}_{22} \text{N}_2 \text{O}_4)$. The dose is the same as the citrate.

Properties and Uses.—*Nux Vomica* and *Strychnia* act chiefly, if not solely, by stimulating the spinal chord and medulla oblongata, and without affecting the functions of the brain. The slightest observable effects from small doses are twitches of the muscles of the arms and legs, occurring especially during sleep, accompanied with restlessness, some anxiety, acceleration of the pulse, and generally slight perspiration. Sometimes the action of the bowels is increased, and the discharge of urine is either augmented, or discharged more frequently—it likewise promotes the venereal appetite. Large doses occasion very violent starting of the muscles—even a tendency to lockjaw, succeeded by stiffness, weariness, pain or rending in the limbs. In their highest degree, these effects amount to violent tetanic spasms, occurring in frequent fits, with brief intervals of repose, acute sensibility, and dreadful alarm. Through whatever form or texture *Strychnia* is introduced into the body, it exerts this action more or less, operating with an energy proportioned to the activity of absorption where it is applied. It is not a cumulative poison like mercury or digitalis; nor does its activity diminish under the influence of habit, as with opium. There is no known antidote for it; morphia is probably the best, as full opiate doses will somewhat arrest these effects. Camphor and sweet oil, have been advised as antidotes, but further investigations are required before they can confidently be relied upon. M. Duclos states that under the application of negative electricity, the poisonous effects of strychnia on animals subside, while under that of the positive they are aggravated. As some patients are powerfully affected by the smallest doses of this agent, too much caution cannot be employed in its administration. I would observe here, that a short time since, a favorite Newfoundland bitch, with three pups about two months old, were poisoned by some evil-minded person, by strychnia placed on meat. One of the pups died in the convulsed condition common to the influence of strychnia; the others were attacked with spasmodic twitchings which continued to increase. From some cause the bitch vomited up her meat, a portion of which was eaten by two chickens about six or eight weeks old. To the bitch and the remaining two pups I gave about a gill of sweet oil to each, followed by about four grains of camphor to the mother, and two grains to the pups, in some bread; they recovered and are doing well. Of the chickens, one was apparently dying, lying on the ground, wings outspread, mouth open, and with frequent spasmodic jerks, the other trembled and spasmodically staggered around like an intoxicated person; to each of these I gave about a grain of camphor in butter, and fastened them up, and in an hour they had both fully recovered. I mention these facts that

further inquiries may be made as regards the antidotal power of camphor in poisoning by strychnia. To determine whether strychnia was the poison administered, the meat vomited by the dogs was carefully examined. Both dogs and chickens were actively purged.

The alcoholic extract of *Nux Vomica* and *Strychnia*, are more generally employed in medicine; and the action of the former is owing to the strychnia it contains. *Strychnia* is used in hemiplegia, paraplegia, partial paralysis of particular joints or muscles, and of the bladder. The paralyzed muscles are always first affected, if they are thrown into spasms at all. If the remedy is to succeed, improvement begins speedily. It must not be used in recent cases of palsy, or while general reaction prevails; neither when signs exist either of local irritation in the brain or spinal chord, or of determination of blood to the head. It has been likewise used in neuralgia, epilepsy, ague, amenorrhea, dysentery, rheumatism, syphilitic osteocopi, and obstinate constipation. In the treatment of gleet, urethral stricture, and recent enlargement of the prostate, I have found it a superior remedy, used internally and locally. In dyspepsia, where there is a want of appetite, constipation, and a sensation of epigastric weight after eating, I have found the combination of one grain of the alcoholic extract of *Nux Vomica*, well triturated with forty grains of ptelein, and divided into twenty pills, an excellent remedy; likewise in dyspepsia connected with impotence, caused by masturbation or venereal excesses; the dose is one pill, repeated three times a day. *Strychnia* will also be found advantageous in many uterine diseases, prolapsus uteri, etc. The dose of strychnia is from one-twentieth of a grain to one-tenth, two or three times a day; it may be rendered more soluble in alcohol or water, by the addition of a few drops of an acid, as the acetic, muriatic, nitric, or sulphuric. Its best form of administration is that of pill. *Brucia* exerts an influence upon the system very similar to that occasioned by strychnia, but is less energetic; its dose is from one-eighth of a grain to half a grain, three or four times a day. In the administration of *Brucia* and *Strychnia*, or any of their salts, great caution must be observed, and the patient carefully watched during its use.

Off. Prep.—*Pilulæ Eupurpurini Compositæ.*

SYRUPI.

Syrups.

Syrups are liquid officinal medicines, of a viscid consistence, produced by the concentrated solution of Sugar alone or Sugar mixed with Honey, in Water, Wine, or Vinegar. Syrups are either Simple or Medicated; simple syrup is where the solution of the sugar is made with water only; it forms the basis of a great many medicated syrups.

Medicated syrups, are those in which one or more medicinal agents enter into the solution, and are commonly prepared by incorporating

Sugar with Vegetable, Aqueous or Spirituous solutions, expressed Juices etc. When the active principles of the ingredients used are dissipated or decomposed by boiling, or where they are not readily soluble in water, they are frequently extracted by Diluted Alcohol, the spirituous ingredient of which is either retained, or driven off, as may be required. occasionally they are prepared by adding a Tincture of the medicinal agent or agents to simple syrup, and evaporating the Alcohol. The stability of a Syrup depends mainly on its composition and consistence, the temperature, and the amount of its exposure to the air; and no ingredients should be admitted into its composition except the active principle required and simple syrup. As most syrups are used in chronic diseases during the absence of febrile or active inflammatory symptoms, the addition of the alcoholic tincture is not objectionable, unless it be in large proportion; but syrups prepared for febrile or inflammatory difficulties should be entirely free from any spirituous liquor whatever.

The best and most economical plan in making syrups, is to employ only Refined Sugar, as it saves the trouble of subsequent clarification, beside being less liable to undergo change. The quantity of sugar required is about two parts to one of liquid; if it be in too small proportion, the syrup will be apt to ferment; if in too large, crystals of sugar will be deposited. The heat employed should be adapted to the character of the active principle; if it be volatile, a gentle heat is required, as well as in cases where a high temperature would decompose it. If it be not injured by heat, concentration should be conducted with a lively fire, and effected as quickly as possible, as in many instances a long continued heat will impair its efficiency. The proper degree of concentration is 30° Baume's saccharometer, when boiling, and 35° when cold; or specific gravity when boiling 1.261, and when cold about 1.319. After the syrup has cooled, if a pellicle forms upon its surface, it has been concentrated too much. Syrups which contain no volatile principle, or one not injured by heat, may frequently be restored to their original condition, after having undergone vinous fermentation, by again boiling them to expel the alcohol and carbonic acid, and sufficiently concentrating them; and a syrup thus recovered is less apt to undergo subsequent change, on account of the fermenting principles having been decreased or consumed. Various means have been devised for the preservation of syrups: a little sulphate of potassa, chlorate of potassa, or sugar of milk, have been recommended for this purpose. One fluidrachm of Hoffman's Anodyne to the pint of syrup will effectually check a tendency to fermentation. The maintenance of a syrup in a regular degree of temperature, say 55° to 60° , will tend very much to lessen its liability to ferment. As a general rule syrups intended to be kept should be bottled while hot, securely corked and sealed, and after cooling should be shaken that the moisture condensed on the cork

may be mixed with the syrup, and not form a diluted layer at the surface.

The syrups used in Eclectic practice, which have been prepared according to the method of W. S. Merrell, are found to keep for a long time without undergoing change; in relation to which he has furnished the following remarks:—Most of the medical syrups should be prepared on the same principles as the Fluid Extracts, only they are less concentrated, and therefore proportionally less. Alcohol should not be retained in their composition, for, as they are administered in larger doses, the presence of spirit in them would be more appreciable and injurious.

All the compounds that have been proposed for syrups in the Eclectic school of practice, such as the Alterative, Scrofulous, and Pulmonary syrups comprise substances whose medical principles are imperfectly soluble in water, and should, therefore, be acted on by Alcohol. I make these preparations with the same apparatus, and by the same process as I make the Fluid Extracts, thus retaining, most perfectly, all the aroma and volatile essences of the ingredients. Physicians and apothecaries who have not such apparatus, may substitute the process laid down under the formula for Alterative Syrup, *which see*.

In all these preparations, the principle should be adopted of confining the boiling and evaporation to the weaker portion of the solution, so that those delicate principles which are evaporated or decomposed by heat may be submitted to its action as little as possible.

SYRUPUS (SYRUPUS SIMPLEX). *Syrup (Simple Syrup)*.

Preparation.—Take of refined Sugar *two pounds and a half*; Water *a pint*. Dissolve the Sugar in the Water with the aid of heat, remove any scum which may form, and strain the Solution while hot.—*U. S.*

History.—Simple syrup, when properly made, is sweet, inodorous, thick, viscid, colorless and transparent. When made with sugar, not well refined, it is apt to be turbid, and may be clarified by beating the white of an egg to a froth with three or four ounces of water, adding this to the syrup, with about five per cent. of animal charcoal if any peculiar flavor or color be present, boiling the whole for a short time so that the albumen may coagulate, and removing the scum which rises to the surface, either by a skimmer, or by filtration through flannel; this will clarify two gallons of syrup.

Properties and Uses.—Syrup is employed in various mixtures, pills, medicated syrups, and extemporaneous prescriptions.

Off. Prep.—Pilulæ Ferri Compositæ; Syrupus Acidi Citrici; Syrupus Ferri Iodidi; Syrupus Ferri Phosphatis; Syrupus Ipecacuanha; Syrupus Tolutanus.

SYRUPUS ACIDI CITRICI. *Syrup of Citric Acid. Lemon Syrup.*

Preparation.—Take of Citric Acid, in powder, *two drachms*; Oil of Lemons *four minims*; Syrup *two pints*. Rub the Citric Acid and Oil of

Lemons with a fluidounce of the Syrup, then add the mixture to the remainder of the Syrup, and dissolve with a gentle heat.—*U. S.*

History.—This syrup is more readily prepared than lemon syrup, keeps better, and is more uniform, though not quite so well flavored. Tartaric acid, which is frequently substituted for the citric, is apt to irritate the stomach, and the syrup prepared with it, does not keep so well. A preparation sold as *Syrup of Lemons*, and which is in no way inferior to the above, is made by adding to one gallon of Water, half a pound of Citric Acid, one pound of Ivory Black, and thirteen pounds of Refined Sugar; boil together, filter, and add one fluidrachm of Oil of Lemon.

Properties and Uses.—This syrup added to water, or to carbonic acid water, forms an agreeable and refrigerant beverage for persons laboring under febrile complaints, and in certain states of the system. From a fluidrachm to half a fluidounce may be added to half a pint of the fluid in which it is to be taken.

SYRUPUS ALLII. *Syrup of Garlic.*

Preparation.—Take of fresh Garlic, sliced and bruised, *six ounces*; Diluted Acetic Acid *a pint*; Refined Sugar, in coarse powder, *two pounds*. Macerate the Garlic in ten fluidounces of the Diluted Acetic Acid, in a glass vessel, for four days, and express the liquor. Then mix the residue with the remainder of the Diluted Acetic Acid, and again express until sufficient has passed to make the whole, when filtered, measure a pint. Lastly, pour the filtered liquor on the Sugar contained in a quart bottle, and agitate till it is dissolved.—*U. S.*

Properties and Uses.—This syrup is useful in chronic catarrhal affections of the lungs, and is particularly beneficial in the cases of infants, on account of the stimulus it affords to the nervous system. The dose is a teaspoonful to a child a year old. The active matter of garlic is more readily taken up by vinegar than water. A syrup of onions is often prepared extemporaneously for coughs, by slicing one or two onions, and laying the slices upon each other with sugar between; this is set by the fire in a saucer or glass vessel, and kept there, until the juice of the onion and the sugar have, by the aid of the heat, formed a syrup in the vessel. It may be given freely.

SYRUPUS ARALIE COMPOSITUS. *Compound Syrup of Spikenard. Pulmonary Balsam.*

Preparation.—Take of the Roots of Spikenard, Elecampane, Comfrey, and Bloodroot, of the Leaves and Flowers of Horehound, and of the Bark of Wild Cherry, each, *one pound*. 1. Grind and mix the articles together; place the whole six pounds in a convenient vessel, cover them with Alcohol of 76 per cent., and macerate for three days. Then transfer the whole to a displacement apparatus, and gradually add Hot Water, until three pints of the Alcoholic tincture have been obtained,

which retain and set aside. 2. Then continue the percolation, and of this second solution reserve so much as contains a sensible amount of Spirit, and distil or evaporate the Alcohol from it. 3. Continue the displacement by Hot Water, until the solution obtained is almost tasteless, and boil down this weaker infusion until, when added to the second solution after the evaporation of its Alcohol, it will make eighteen pints. 4. To these two solutions combined, add *twenty-four pounds* of Refined Sugar, and dissolve it by heat, carefully removing any scum which arises as it comes to the point of boiling; and if it exceeds twenty-one pints, evaporate to that quantity with constant stirring. Then remove from the fire, and when nearly cold, add the three pints of Alcoholic Tincture first obtained and set aside, and make three gallons of Syrup. Each pint will contain the virtues of four ounces of the ingredients.

Properties and Uses.—This is an elegant remedy for obstinate coughs of long standing, and pulmonary affections generally. It is often employed advantageously in pulmonary and bronchial difficulties combined with one-fourth part of Fluid Extract of Queen's Root. The dose of the syrup is half a fluidounce three or four times a day.

SYRUPUS ASSAFETIDÆ. *Syrup of Assafetida.*

Preparation.—Take of Assafetida *an ounce*; Boiling Water *a pint*; Sugar *two pounds*. Triturate the Assafetida in a mortar with a portion of the Boiling Water until a uniform paste is formed, then gradually add the remainder of the Water, strain and add the Sugar, dissolving it with a gentle heat.

History.—Good assafetida contains nearly six per cent. of volatile oil, which would be dissipated were much heat employed in the solution of the sugar. The object of employing boiling water instead of cold, is to have more of the gum-resin taken up, and which is permanently dissolved or suspended by the sugar. This syrup is nearly white when first made, but gradually assumes a pinkish tinge; it is quite permanent, keeping for several months without any material change, and has the advantage of being entirely free from alcohol, which is often objectionable.

Properties and Uses.—This is an excellent form for the administration of assafetida, being less stimulant than the tincture, and more prompt in its action than the pill. The dose is one or two tablespoonfuls, repeated three or four times a day. If used in enema, two to four fluidounces may be injected into the rectum at one time. Other Antispasmodics may be combined with it, as fluid extracts of Black Cohosh, Blue Cohosh, Ladies Slipper Root, Sculleap, Valerian, etc., according to indications.

SYRUPUS CINNAMOMI. *Syrup of Cinnamon.*

Preparation.—Take of Tincture of Cinnamon *four fluidounces*; Water *three pints*; Refined Sugar *seven pounds and a half*; Essence of Cinna-

mon (*Tincture of the Oil*,) *four fluidrachms*. Mix the Tincture with three pounds of the Sugar in a shallow dish, and evaporate the Alcohol with the aid of a gentle heat, or allow it to evaporate spontaneously; then add the remainder of the Sugar, and dissolve it in two pints and a half of the Water. With the remaining half pint of Water, beat up the whites of two Eggs, add it to the Syrup, boil for one or two minutes, strain through a Canton flannel bag, and when nearly cool add the Essence of Cinnamon.

Properties and Uses.—This syrup is a warm aromatic stomachic, carminative, and astringent. It is chiefly used as an adjuvant to other less pleasant medicines, especially in the treatment of diarrhea, dysentery, hemorrhages, and where astringents are indicated. It may be given in doses of one or two fluidrachms.

SYRUPUS COCHLEARIÆ COMPOSITUS. *Compound Syrup of Horseradish.*

Preparation.—Take of the recent Root of Horseradish, grated, *two ounces*; Boneset, Leaves and Tops, *one ounce*; Canada Snakeroot *half an ounce*; Boiling Water, Diluted Acetic Acid, of each, *a sufficient quantity*; Refined Sugar *two pounds*. Infuse the Boneset and Canada Snakeroot, in half a pint of the Boiling Water, and express with strong pressure, adding Boiling Water to the mass until half a pint of infusion is obtained; then add the Sugar and dissolve by gentle heat.

Add the Horseradish to Dilute Acetic Acid, half a pint; let it stand for two days, and then express, adding Dilute Acetic Acid to the mass until half a pint of the Acetous Solution is obtained. Add this to the above Syrup, and agitate until all the Sugar is dissolved.

Properties and Uses.—This forms an efficient preparation for obstinate colds, catarrhs, hoarseness, and chronic irritation of the throat and fauces. The dose is from one to four fluidrachms, every two or three hours. The following compound, known as "*Cough or Vegetable Elixir*," has been found a most beneficial agent in chronic pulmonary affections, cough, etc. To one gallon of good cider vinegar, add half a pound, each, of Balsam of Tolu and gum Arabic, dissolve by heat, and add of Refined Sugar six pounds; when all is dissolved, remove from the fire, and add of Tincture of Opium, eighteen fluidounces. The dose of this is a teaspoonful three, four, or five times a day, or whenever the cough is severe. Sometimes molasses may be substituted for the sugar, or honey.

SYRUPUS CORYDALLIS COMPOSITUS. *Compound Syrup of Turkey Corn.*

Preparation.—Take of the Root of Turkey Corn, coarsely bruised, *two pounds*; the Leaves of Twin-leaf *one pound*; Blue Flag Root *one pound*; Sheep Laurel Leaves *half a pound*. 1. Mix the articles together; place the whole four pounds and a half in a convenient vessel, cover them with Alcohol of 76 per cent., and macerate for three days. Then transfer the whole to a displacement apparatus, and gradually add

Hot Water until two pints and four fluidounces of the Alcoholic Tincture have been obtained, which retain and set aside. 2. Then continue the percolation, and of this second Solution reserve so much as contains a sensible amount of Spirit, and distil or evaporate the Alcohol from it. 3. Continue the displacement by Hot Water, until the Solution obtained is almost tasteless, and boil down this weaker infusion until, when added to the second Solution after the evaporation of its Alcohol, it will make thirteen pints and a half. 4. To these two Solutions combined, add eighteen pounds of Refined Sugar, and dissolve it by heat, carefully removing any scum which arises as it comes to the point of boiling; and if it exceeds fifteen pints and twelve fluidounces, evaporate to that quantity with constant stirring. Then remove from the fire, and when nearly cold add the two pints and four fluidounces of Alcoholic Tincture first obtained and set aside, and make eighteen pints of Syrup. It may also be flavored with some agreeable, aromatic essence, as Sassafras, Wintergreen, Prickly Ash Berries, etc.

Properties and Uses.—This is a valuable alterative syrup, and is used with much success in syphilis, scrofula, liver affections, and rheumatism. The iodide of potassium may be added to it, in the same manner as usually pursued with the Compound Syrup of Stillingia, to which this is by no means, second. The dose is a fluidrachm, three or four times a day, in half a gill of water.—*J. K.*

Some twenty years since, a half-breed Indian, called Ben Smith, in the State of New York, made a syrup, which gained considerable reputation as a remedy in syphilitic diseases, and which sold rapidly for three dollars per bottle; the following is the formula for its preparation: Take of Indian Hemp, (*Apocyn. Cann.*), Virginia Sarsaparilla, Inner Bark of White Pine, each, *one pound*; Mezereon *four ounces*; Sheep Laurel *half a pound*; Water *four gallons*; Sugar *eight pounds*. Place the Plants in the water, boil for a few minutes, and then gradually evaporate, until about two gallons of decoction are left, then strain, and add the Sugar. To each quart bottle of this Syrup he added *forty drops* of Nitric Acid, and *twenty grains* of Tartar Emetic dissolved in a *sufficient quantity* of Spirits. The dose was a wineglassful three times a day. I have never been able to ascertain the true botanical character of the Virginia Sarsaparilla. This syrup has been found as efficacious in syphilis, when prepared without the tartar-emeti.

SYRUPUS IPECACUANHÆ. *Syrup of Ipecacuanha.*

Preparation.—Take of Ipecacuanha, in powder, *eight ounces* Troy; Alcohol, sp. gr. 0.835, Syrup, of each, *a sufficient quantity*. Add the Ipecacuanha to *twelve fluidounces* of the Alcohol, and allow it to stand for twelve hours; then add *sufficient* Alcohol to make the mixture of the consistence of Syrup, and introduce the whole into a suitable displacer, in which it gradually settles down as the Alcohol percolates; a piece of

muslin is laid on the surface, and when it has settled down uniformly, more Alcohol is added until the filtered liquid measures half a gallon, reserving the first half pint that comes through; distil and evaporate the remainder to eight fluidounces, and then add the reserved half pint. This forms a Fluid Extract of Ipecacuanha, of which two fluidounces represent one ounce Troy, of the root.

To four pints of Syrup add eight fluidounces of the above Fluid Extract of Ipecacuanha, and evaporate the Mixture to three pints; then add four pints of Syrup, and one pint of Water, making one gallon of Syrup of Ipecacuanha.

History.—Owing to the presence probably of gum and coloring matter, the Syrup of Ipecacuanha, as generally prepared by diluted alcohol, is very liable to fermentation; but made according to the above formula of Mr. Joseph Laidley, it contains but little, if any alcohol, possesses all the medicinal virtues of the drug, and keeps as well as simple syrup, without fermenting. When the four pints of syrup are added to the fluid extract, should it not be perfectly clear, it may be rendered so by mixing with water the white of one egg, adding it to the syrup, boiling for a few minutes and straining.

Properties and Uses.—This syrup is emetic and expectorant; it is used principally in cases of children. As an emetic the dose for an adult is one or two fluidounces; for a child one or two years old, one or two fluidrachms—to be repeated every fifteen or twenty minutes till it operates. When used as an expectorant, an adult may take one or two fluidrachms; a child, from five to twenty minims.

Mr. A. G. Dunn prepares a "*Saccharated Alcoholic Extract of Ipecacuanha*," which he considers superior to any other preparation of the drug; it is made as follows: Bruise the Root of Ipecacuanha *four ounces*, to a coarse powder, and macerate for thirty days in Diluted Alcohol *sixteen fluidounces*, shaking it occasionally; then filter and express. The tincture thus formed is to be evaporated to two fluidounces, and then mixed with Refined Sugar, *eight ounces*; lastly, triturate in a stone mortar until it is entirely dry. This preparation has the peculiar odor and taste of Ipecacuanha, is of a brownish-yellow color, is soluble in water, alcohol, ether, mucilage of gum Arabic, etc., is of uniform strength, and agreeable to take. The dose is the same as of the powdered root.

SYRUPUS LOBELIÆ. Syrup of Lobelia.

Preparation.—Take of Vinegar of Lobelia *two pints*; Sugar *four pounds*. Dissolve with the aid of heat, not to exceed 180°, and continue the heat for three hours, removing any scum which may form, and strain while hot.

Properties and Uses.—This forms a pleasant expectorant syrup, and notwithstanding the volatile properties of lobelia are dissipated by heat, this syrup will be found sufficiently active for practical purposes; the

long-continued digestion removes the peculiar, disagreeable taste of the lobelia. It will be found very useful in infantile cases of catarrh, pertussis, croup, pectoral diseases, to produce emesis, and to bring the system under the relaxing influence of lobelia. The dose is from one fluidrachm to half a fluidounce.—*N. T. Isgrigg.*

SYRUPUS MITCHELLÆ COMPOSITUS. *Compound Syrup of Partridge-Berry. Mothers' Cordial.*

Preparation.—Take of Partridge-Berry *one pound*; Helonias Root, High Cranberry Bark, Blue Cohosh Root, of each, *four ounces*. Grind, and mix the articles together; place the whole pound and three quarters in a convenient vessel, cover them with fourth proof Brandy, and macerate for three days. Then transfer the whole to a displacement apparatus, and gradually add Brandy, until three pints of spirituous tincture have been obtained, which reserve. Then continue the displacement with Hot Water until the liquid passes tasteless, add to this *two pounds* of Refined Sugar, and evaporate by a gentle heat to *five pints*; remove from the fire, add the reserved *three pints* of Spirituous Tincture, and flavor with Essence of Sassafras. Strictly speaking, this is not a Syrup, but a sweetened Infusion, yet I place it here, as being nearly in its appropriate class.

Properties and Uses.—This preparation is a uterine tonic and antispasmodic. It may be used in all cases where the functions of the internal reproductive organs are deranged, as in amenorrhea, dysmenorrhea, menorrhagia, leucorrhea, and to overcome the tendency to habitual abortion. The dose is from two to four fluidounces, three times a day. Pregnant females, especially those of a delicate, or nervous system, will find it an advantage to take one or two doses daily, for several weeks previous to parturition, as by the energy it imparts to the uterine nervous system, the labor will be very much facilitated, beside which, it frequently removes the cramps to which some females are liable during the latter weeks of utero-gestation. The medicine appears to exert a specific influence on the uterus.—*J. K.*

A preparation called the "*Parturient Balm*," has also been used and recommended in the above diseases, but I have found it to be of less efficacy; however, as some practitioners employ it, I introduce the formula for its preparation at this place: Take of Blue Cohosh Root, Spikenard Root, each, *four pounds*; Black Cohosh Root, Partridge-Berry Herb, Queen of the Meadow Root, of each, *two pounds*; Ladies Slipper Root, Comfrey Root, of each, *one pound*. Proceed to make a Syrup, similar to the directions given for the Compound Syrup of Sarsaparilla, reserving eight pints of the strongest tincture first obtained, using sixty-four pounds of Refined Sugar, and making eight gallons of Syrup. The dose of this is from a teaspoonful to a tablespoonful three or four times a day.

SYRUPUS PHYTOLACÆ COMPOSITUS. *Compound Syrup of Poke.*

Preparation.—Take of Poke Root, and Bark of American Ivy, (*Ampelopsis Quinq.*), each coarsely bruised, *one pound*; Black Cohosh Root coarsely bruised, and Sheep Laurel Leaves, each, *half a pound*. 1. Mix the articles together; place the whole three pounds in a convenient vessel, cover them with Alcohol of 76 per cent., and macerate for three days. Then transfer the whole to a displacement apparatus, and gradually add Hot Water, until one pint and a half of the Alcoholic tincture passes, which retain and set aside. 2. Then continue the percolation, and of this second solution reserve so much as contains a sensible amount of Spirit, and distil or evaporate the Alcohol from it. 3. Continue the displacement by Hot Water, until the solution obtained is almost tasteless, and boil down this weaker infusion until, when added to the second solution after the evaporation of its Alcohol, it will make nine pints. 4. To these two solutions combined, add *twelve pounds* of Refined Sugar, and dissolve it by heat, carefully removing any scum which arises as it comes to the point of boiling, and if it exceeds ten pints and a half, evaporate to that quantity with constant stirring. Then remove from the fire, and when nearly cold, add the pint and a half of Alcoholic tincture first obtained and set aside, and make one gallon and a half of Syrup. Flavor with some aromatic essence, as Sassafras, Winter-green, etc.

Properties and Uses.—This syrup is an excellent alterative and anti-syphilitic, and is beneficial in syphilis, scrofula, and rheumatism. If required, Iodide of Potassium may be added to it, as in the instance of Compound Syrup of Stillingia. The dose is a teaspoonful three or four times a day, in half a gill of water.—*J. K.*

SYRUPUS PRUNI VIRGINIANÆ. *Syrup of Wild Cherry Bark.*

Preparation.—Take of Wild Cherry Bark, in coarse powder, *five ounces*; Refined Sugar *two pounds*; Water *a sufficient quantity*. Moisten the Bark thoroughly with Water, let it stand for twenty-four hours in a close vessel, then transfer it to a percolator, and pour Water gradually upon it until a pint of filtered liquor is obtained. Add to this the Sugar, in a bottle, and agitate occasionally until it is dissolved.—*U. S.*

Properties and Uses.—This forms a handsome tonic and sedative syrup, which may be used in all cases where wild cherry bark is indicated or desired. It may be given in doses of half a fluidounce.

SYRUPUS RHEI ET POTASSÆ COMPOSITUS. *Compound Syrup of Rhubarb and Potassa. Neutralizing Cordial.*

Preparation.—Take of best India Rhubarb, in coarse powder, and Bicarbonate of Potassa, each, *one pound*; Cinnamon, Golden Seal, of each, *half a pound*; Refined Sugar *six pounds*; Fourth Proof Brandy *two gallons*; Oil of Peppermint *two fluidrachms*. Macerate the Rhu-

barb, Potassa, Cinnamon, and Golden Seal, in the Brandy for two days, then express the tincture with strong pressure, and add to it the Oil of Peppermint, previously dissolved in a little Alcohol. Break up the cake or compressed residue from the press, and place it in a displacement apparatus, and gradually add Warm Water, until the strength of the articles is exhausted. Evaporate this solution to eight pints, and while the liquor is still hot dissolve in it the Sugar. Continue the evaporation, if necessary, until when added to the tincture first obtained, it will make three gallons, and mix the two solutions together. Strictly Speaking, this is not a Syrup, but a sweetened Tincture.—*W. S. M*

Dr. Hill has kindly furnished me with the formula by which he prepares this syrup, and which many physicians prefer on account of its pleasantness and efficacy. It is as follows: Take of best India Rhubarb, in coarse powder, and pure Carbonate of Potassa, each, *two ounces*; Golden Seal, Cinnamon, of each, *one ounce*; Refined Sugar *four pounds*; Brandy *one gallon*; Oil of Peppermint *twenty minims*. Macerate the Rhubarb, Golden Seal, and Cinnamon, in half a gallon of the Brandy for six hours, with a gentle heat; then transfer the mass to a percolator and displace with the remaining half gallon of Brandy. The remaining strength, if there be any, can be obtained by adding Water until the liquor comes off tasteless. To this add the Carbonate of Potassa, Sugar, and Oil of Peppermint, this last having been previously rubbed with a sufficient quantity of the Sugar to absorb it and mix the two liquors. The whole of the active properties of the ingredients may be obtained with more certainty by using Alcohol 76 per cent., instead of Brandy, owing to the great want of uniformity in the quality of the latter.

Properties and Uses.—This syrup is an agreeable laxative, antacid, and tonic. It may be used in cases of obstinate constipation, acidity of stomach, dyspepsia, and as a laxative in pregnancy and where piles are present. It is the principal remedy employed by Eclectics in diarrhea, dysentery, cholera-morbus, cholera-infantum, and in the same diseases as the Compound Powder of Rhubarb. The dose for an adult is a table-spoonful, every half hour, hour, or two hours, according to the urgency of the symptoms; for a child in proportion to its age.

SYRUPUS RUMECIS COMPOSITUS. *Compound Syrup of Yellow Dock. Scrofulous Syrup.*

Preparation.—Take of Yellow Dock Root *two pounds*; Bark of the Root of False Bittersweet *one pound*; Bark of American Ivy, (*Ampelopsis Quinq.*), and Figwort, (*Scroph. Mariland.*), of each, *half a pound*; Refined Sugar *sixteen pounds*. 1. Grind and mix the drugs together, place the whole four pounds in a convenient vessel, cover them with Alcohol of 76 per cent., and macerate for two days. Then transfer the whole to a common displacement apparatus, and gradually add Hot Water, until two pints have been obtained, which retain and set aside.

2. Then continue the percolation, and of the second solution reserve so much as contains a sensible amount of Spirit, and distil or evaporate the Alcohol from it. 3. Continue the displacement, by Hot Water, until the solution obtained is almost tasteless, and boil down this weaker infusion till it begins to thicken, or until, when added to the balance remaining of the second portion, after the evaporation of the Alcohol, it will make twelve pints. 4. To these two solutions combined, add the Sugar, and dissolve by heat, carefully removing the scum which arises as it comes to the point of boiling. Then if it exceeds fourteen pints, evaporate to that quantity with constant stirring; remove from the fire, and when nearly cold, add the two pints of Alcoholic tincture first obtained and set aside, and make two gallons of syrup. Each pint will contain the virtues of four ounces of the ingredients. It may be flavored with some aromatic essence.

Properties and Uses.—This syrup is alterative and antiscrofulous, and is extensively and successfully used in the treatment of scrofula, all scrofulous affections, and many cutaneous diseases. Iodide of potassium is frequently added to it, in the proportion of an ounce to the pint of syrup. The dose is from one to four fluidrachms, three times a day, in about a gill of water; or when the iodide is added, one or two fluidrachms, in water.

SYRUPUS SANGUINARIÆ. Syrup of Bloodroot.

Preparation.—Take of Bloodroot, in coarse powder, *eight ounces*; Acetic Acid *four fluidounces*; Water *five pints*; Refined Sugar *two pounds*, Troy. Macerate the Bloodroot for three days, in two fluidounces of the Acetic Acid, and a pint of the Water; then transfer to a percolator, and displace with the remainder of the Acetic Acid mixed with the balance of the Water. Evaporate by means of a water-bath, to eighteen fluidounces, add the Sugar, and form a syrup.

History.—By the above process carefully conducted, the root will be exhausted, and a syrup of a deep ruby color obtained, opaque in quantity, but transparent in thin strata, having a strongly acrid and bitterish taste.

Properties and Uses.—This syrup may be used in all cases where Bloodroot is applicable, in doses of from ten to sixty drops. An excellent cough mixture is composed of equal parts of Syrup of Squill, Syrup of Balsam of Tolu, Syrup of Ipecacuanha, Syrup of Bloodroot, and Purgative; the dose of which is a teaspoonful whenever the cough is troublesome. Syrups of Wild Cherry Bark, Bloodroot, Balsam of Tolu, and Fluid Extract of Stillingia, combined in equal proportions, have been found very useful in chronic bronchial and catarrhal affections.

SYRUPUS SARSAPARILLÆ COMPOSITUS. Compound Syrup of Sarsaparilla. Alterative Syrup.

Preparation.—Take of the Roots of Honduras Sarsaparilla, Yellow Dock, Burdock, and ground Guaiacum Wood, each, *ten ounces*; Bark of

the Root of Sassafras, of Southern Prickly Ash, Elder Flowers, Blue Flag Root, of each, *eight ounces*. 1. Grind and mix the articles together, place the whole four pounds and a half in a convenient vessel, cover them with Alcohol of 76 per cent., and macerate for two days. Then transfer the whole to a common displacement apparatus or percolator, and gradually add Hot Water, until two pints have been obtained, which retain and set aside. 2. Then continue the percolation, and of the second solution reserve so much as contains a sensible amount of Spirit and distil or evaporate the alcohol from it. 3. Continue the displacement, by Hot Water, until the solution obtained is almost tasteless, and boil down this weaker infusion till it begins to thicken, or until, when added to the balance remaining of the second portion, after the evaporation of the alcohol, it will make twelve pints. 4. To these two solutions combined, add *sixteen pounds* of Refined Sugar, and, by heat, dissolve—carefully removing the scum which arises as it comes to the point of boiling. Then, if it exceeds that quantity, evaporate the Syrup with constant stirring, to fourteen pints, remove from the fire, and when nearly cold, add the two pints of tincture first obtained, and make two gallons of Syrup. Each pint will contain the virtues of four ounces of the ingredients. It may be flavored with essence of Wintergreen, Sassafras, or Prickly-Ash Berries, etc.

Properties and Uses.—This forms a valuable Syrup, which may be used in all cases where an alterative is indicated; in chronic hepatitis, rheumatism, syphilis, scrofula, cutaneous diseases, ulcers, white swelling, rickets, necrosis, and every taint of the system. Some physicians add an ounce of the Iodide of Potassium to every pint of Syrup. The dose is from a teaspoonful to a tablespoonful, three or four times a day, in about a gill of water.

SYRUPUS SCILLÆ. *Syrup of Squill.*

Preparation.—Take of Vinegar of Squill *a pint*; Refined Sugar *two pounds*. Add the Sugar to the Vinegar of Squill, dissolve with the aid of heat, removing any scum which may form, and strain the solution while hot.—*U. S.*

Properties and Uses.—Syrup of Squill is used as an expectorant in coughs and catarrhs, and as an emetic in infantile cases of catarrh, and other pectoral complaints. It is frequently given in combination with Tincture of Lobelia, and other emetic or expectorant agents. The dose of it is about a fluidrachm.

SYRUPUS SENEGÆ. *Syrup of Seneka.*

Preparation.—Take of Seneka, in coarse powder, *four ounces*; Alcohol *half a pint*; Water *a pint and a half*; Refined Sugar *fifteen ounces*. Mix the Alcohol and Water, pour half a pint of the liquid on the Seneka, and allow the mixture to stand for twelve hours; then transfer it to a percolator, and gradually pour upon it the remainder of the menstruum. When the liquor has ceased to pass, evaporate it by means of a water-

bath to half a pint, filter, and, having added the Sugar, dissolve with the aid of heat, removing any scum which may form, and strain the solution while hot.—*U. S.*

A still better plan for preparing this Syrup, is according to that laid down for Syrup of Ipecacuanha, by first preparing an Alcoholic Fluid Extract, and adding it to Simple Syrup; by this method the separation of the gum and other matters which cause a tendency to fermentation, is entirely avoided.

Properties and Uses.—This forms a stimulating expectorant, which is often very useful in pectoral complaints. It is frequently combined with syrup of squill, tincture of lobelia, syrup of sanguinaria, etc. Its dose is one or two fluidrachms.

SYRUPUS STILLINGIÆ. *Syrup of Queen's Root.*

Preparation.—Take of Queen's Root *three pounds*; Prickly Ash Berries *one pound and a half*; Refined Sugar *eighteen pounds*. 1. Grind, and mix the articles together; place the whole four pounds and a half in a convenient vessel, cover them with Alcohol of 76 per cent., and macerate for three days. Then transfer the whole to a displacement apparatus, and gradually add Alcohol, until five pints of the Alcoholic tincture have been obtained, which retain and set aside. 2. Then continue the percolation with Hot Water, until the liquor passes almost tasteless, add the Sugar to it, and evaporate by gentle heat until thirteen pints are obtained; to which add the reserved five pints of Alcoholic tincture, and make eighteen pints of Syrup. It may be flavored with Essence of Sassafras, if required.

Properties and Uses.—This has been found highly beneficial in bronchial and laryngeal affections, also in obstinate cases of rheumatism, and wherever a stimulating alterative is required. The dose is from a fluidrachm to half a fluidounce, three, four, or five times a day, according to the urgency of the symptoms. It should be taken in water.

SYRUPUS STILLINGIÆ COMPOSITUS. *Compound Syrup of Queen's Root.*

Preparation.—Take of Queen's Root, and Root of Turkey-Corn, each, *two pounds*; Blue Flag-root, Elder Flowers, and Pipsissewa Leaves, of each, *one pound*; Coriander, and Prickly Ash Berries, of each, *half a pound*. 1. Grind, and mix the articles together; place the whole eight pounds in a convenient vessel, cover them with Alcohol of 76 per cent., and macerate for three days. Then transfer the whole to a displacement apparatus, and gradually add Hot Water until four pints of the Alcoholic tincture have been obtained, which retain and set aside. 2. Then continue the percolation, and of this second solution reserve so much as contains a sensible amount of Spirit, and distil or evaporate the Alcohol from it. 3. Continue the displacement by Hot Water, until the solution obtained is almost tasteless, and boil down this weaker infusion until, when added to the second solution after the evaporation of its Alcohol,

it will make twenty-four pints. 4. To these two solutions combined, add *thirty-two pounds* of Refined Sugar, and dissolve it by heat, carefully removing any scum which arises as it comes to the point of boiling; and if it exceeds twenty-eight pints, evaporate to that quantity, with constant stirring. Then remove from the fire, and when nearly cold add the four pints of reserved Alcoholic tincture and make four gallons of Syrup, each pint of which will be equal to four ounces of the ingredients in medicinal virtue.

Properties and Uses.—This is a most powerful and effective alterative, and is extensively used by Eclectic practitioners in all syphilitic, scrofulous, osseous, mercurial, hepatic, and glandular diseases; or in every case where an alterative is indicated. It is most commonly given with an ounce of Iodide of Potassium added to each pint of the syrup. The dose is a fluidrachm, three or four times a day, in half a gill of water; but where the Iodide is omitted, the dose is from a fluidrachm to a fluidounce, three or four times a day, also in water. This is considered one of the most potent Eclectic remedies in all chronic diseases.

SYRUPUS TOLUTANUS. *Syrup of Tolu.*

Preparation.—Take of Tincture of Tolu *a fluidounce and a half*; Refined Sugar *two and a half pounds*, Troy; Water *a pint*. Mix the Tincture with one pound of Sugar in a shallow dish, and evaporate the Alcohol with the aid of a gentle heat, or allow it to evaporate spontaneously; then add the remainder of the Sugar, and dissolve it in twelve ounces of the Water. With the remaining four ounces of Water, beat up the white of one Egg, add it to the Syrup, boil for one or two minutes, and strain through a Canton flannel bag.

Properties and Uses.—This syrup is used in coughs, and to impart an agreeable flavor to mixtures; the dose is from half a fluidrachm, to two, or even four fluidrachms.

SYRUPUS ZINGIBERIS. *Syrup of Ginger.*

Preparation.—Take of Tincture of the best Jamaica Ginger *two fluid-ounces*; Refined Sugar *five pounds*; Water *two pints*. Mix the Tincture with two pounds of Sugar in a shallow dish, and evaporate the Alcohol with the aid of a gentle heat, or allow it to evaporate spontaneously; then add the remainder of the Sugar, and dissolve it in twenty-four ounces of the Water. With the remaining eight ounces of the Water, beat up the whites of two Eggs, add it to the Syrup, boil for one or two minutes, and strain through a Canton flannel bag.

Properties and Uses.—Syrup of Ginger is used as a warm stomachic addition to purgative, tonic, or other infusions or mixtures, and to impart flavor to drinks. The dose is from half a fluidrachm, to two, three, or four fluidrachms.

TINCTURÆ.

Tinctures.

Tinctures are officinal preparations, obtained either by the solution, maceration, digestion, or percolation of the principles of certain substances in Alcohol, or by the simple mixture of Alcohol with an Acid or Alkaline liquid. They are *Simple tinctures* when they contain the active principles of a single substance, and *Compound tinctures*, when they contain those of several. Occasionally, Spirit of Ammonia or Ether are employed as the solvents, furnishing *Ammoniated tinctures*, and *Ethereal tinctures*. Tinctures are also prepared by means of gin, brandy, wine, etc., as the solvent; the former are termed *Spirituuous Tinctures*, and those with wine, *Vinous Tinctures*, or *Medicated Wines*. When the principle to be dissolved is insoluble in water, rectified spirit, (alcohol of sp. gr. 0.835,) is preferred as the menstruum; when it is soluble in both alcohol and water, diluted or proof spirit is preferred. The former is applicable to resins, guaiacum, camphor, and the essential oils, in which the presence of water would interfere with the solvent power of the alcohol; the latter is proper where the articles contain extractive, tannin, gum united with resin, or essential oil.

In preparing Tinctures, as a general rule, the medicine should be in the dry state, and very finely pulverized; it should first be moistened with the liquid, after which the whole quantity may be added. There are, however, some exceptions to this rule, as for instance, where the powder, by agglutination, presents an obstacle to the action of them enstruum: in this case, the substance to be acted upon should be coarsely bruised, sliced, or pulverized. It is recommended that, when several substances of various solubilities are employed, they be added successively to the spirit; those least soluble first, those most so last; as otherwise the liquid might become saturated with the ingredient for which it has the strongest affinity, and thus be rendered incapable of dissolving a due proportion of the others.

Tinctures prepared by maceration or digestion require to be kept in well-stopped vessels in order to prevent the evaporation of alcohol; to be frequently shaken during the maceration or digestion, which should be continued, at ordinary temperatures, for a period of two weeks: if prepared by digestion a shorter time is required. They may then be expressed, if required, and filtered, though some are in the habit of allowing the dregs to remain, on the supposition that it contributes to maintain the uniformity of strength, and prevent any precipitation that might otherwise ensue; but this is an error.

The preparation of tinctures by percolation or displacement, answers very well for small operations, but is scarcely adapted in cases where any large quantity of tincture is required, and is not so excellent a mode for general purposes as that of maceration, unless skillfully executed by persons experienced in the proper method of conducting it.

It has, likewise, been recommended to suspend in the solvent, immediately under its surface, the solid matter in powder or bruised, and contained loosely in a bag, raising it occasionally above the surface of the liquor, allowing it to drain, and again immersing it. It is said that the period of maceration is much shortened in this way. As the upper portion of liquid becomes heavier by impregnation with the substances dissolved, it falls to the bottom, and a constant current is thus established, which continues until the liquid is saturated, or the solid substance exhausted.

Preserved vegetable juices, or the tinctures of the expressed juices of various plants, are prepared by adding alcohol of 0.838 one part, to four parts of the juice, after this last has stood for twenty-four hours, and then filtering another period of twenty-four hours after the addition of the alcohol. This preserves the juice, and at the same time precipitates the inert mucilaginous matter.

Tinctures should always be kept in accurately stopped bottles, as, otherwise, the evaporation of the alcohol, by increasing their strength, might be attended with serious consequences.

I am indebted to Mr. Wm. S. Merrell, of this city, an experienced and practical pharmacist, who has kindly furnished me with the following observations on this subject :

“A *Tincture*, in the pharmaceutical sense, is the solution of some medicinal substance in Alcohol, either pure or diluted, and is mostly employed to separate the more active Medicinal principles of vegetables from their woody fiber and other nearly inert substances, as starch, gum, and mucilage, which are not soluble in that menstruum, and present them in a liquid form. The greater part of the more active proximate principles of vegetables are soluble in strong Alcohol, but many of them, especially in their native combinations, are also soluble in Water, and a few, of an extractive or saline character, are more soluble in the latter than in the former menstruum. And in most cases an admixture of Water facilitates the process of tincturing, by softening the mucilage and other principles not soluble in Alcohol, thus enabling the latter to penetrate the substance, and act more readily. In these cases, therefore, a dilute spirit, or mixture of alcohol and water, should be used ; and the proper proportions of such mixture for tincturing the different articles of the *Materia Medica*, becomes an important lesson to be learned by the apothecary and the physician.

In the tinctures recognized as officinal, in the U. S. Dispensatory, the strength of the solvent is, in most cases, indicated with sufficient accuracy, but in the progress of reform, a great number of medicines have been brought into use, in respect to which we have hitherto had no such guide. Some general suggestions may, therefore, be useful to the less experienced practitioner.

In all cases it is proper to use as dilute a spirit as is adequate to obtain the strongest practical tincture, provided it be sufficiently strong to prevent fermentation, and preserve the solution from decomposition and change; for the alcoholic stimulant, in itself considered, is in most cases undesirable. The common alcohol of commerce, marked 76 per cent., is sufficiently strong for almost any of these preparations. It is strong enough to dissolve the resins, such as guaiacum, tolu, etc., and also the essential oils, in the proportions directed, and this is all that is required.

The dilute alcohol of the Dispensatory, is nearly represented by a mixture of the two parts common alcohol, of 76 per cent., and one part water, which is about the right strength for the majority of the vegetable tinctures. Those roots, however, of which the medicinal virtues consists mostly of a resinoid, as podophyllum, leptandra, and many others, and also those vegetables containing much essential oil, require a solvent somewhat stronger than this, and either the 76 per cent. alcohol, or that reduced but little below this standard, say to the strength of fourth proof spirits, should be used.

On the other hand, medicines which are almost wholly of an extractive character, as aloes, and others whose medicinal principles are soluble in water, require very dilute alcohol to tincture them, (*see Art. Aloes, in U. S. Disp.*) as the only use of the spirit in this case is to precipitate and render insoluble the mucilage, and to prevent the tincture from spoiling. Gum Kino should be tinctured in dilute alcohol, and not in strong, as directed in the Pharmacopœias; for if prepared in alcohol of officinal strength, it will rapidly gelatinize on standing, which will not be the case if prepared with spirit somewhat diluted, and kept in well closed vessels.

In the preparation of tinctures from such vegetables as require dilute spirit, the process may be much facilitated, if not rendered more perfect, by first wetting the ground or powdered substance with the proportion of water that is admissible, say one-third. Apply the water *hot*, and after digesting a short time, sufficient to expand the ligneous fiber, and soften or dissolve the gum, mucilage, etc., add the required proportion of Alcohol, which can thus readily reach and dissolve the active principles soluble in it, while at the same time, it precipitates the dissolved mucilage, etc. For example:

TINCTURA CIMICIFUGÆ. *Tincture of Black Cohosh.*

- R Black Cohosh Root, *four ounces.*
 Boiling Water, *eight fluidounces.*
 Alcohol, 76 per cent. *one pint and a half.*

Powder or bruise the root, and pour the boiling water upon it, and let it digest for two hours; then, when sufficiently cool, transfer it to the bottle in which it is to be kept, and add the alcohol. Let it stand three days, frequently shaken, and filter for use.

[I differ somewhat with Mr. Merrell's method of preparing this tincture. As the virtue exists principally in the resin and oil, there is no necessity for the addition of any Water to the preparation, and I have obtained much better results from the tincture, with strong alcohol, as I always prepare it, than from the diluted tincture.—K.]

Acting upon this principle, I many years ago made what I consider an improvement in the mode of preparing the tincture of opium, which should be adopted by every physician and apothecary. The directions in the old Pharmacopœias are, to slice the opium, and put it in the bottle with dilute alcohol, and macerate with frequent shaking, for two weeks; but if the opium be hard and compact, many small lumps will not be dissolved for a long time. I have examined the dregs of laudanum after standing six months under the tincture, and have found in them still unpenetrated pieces of pure opium. The consequence of such a mode of preparation is, that the tincture will at first be quite weak, and will continue to increase in strength until near the last, when it will be far above the standard strength, and liable to produce dangerous consequences. To avoid this objection, the later editions of the U. S. Pharmacopœias direct that the opium be first dried and powdered; but this adds one-fourth to the expense, if the opium be purchased ready powdered, and takes time, trouble and labor, which the physician cannot often spare, to dry and powder it himself, and hence it is seldom done.

The whole difficulty may be avoided by the following method: Take of good Turkey Opium, 1200 grains, (about $2\frac{3}{4}$ ounces avoirdupois. This is the proportion required by the U. S. and most of the European Dispensatories, although most of the laudanum sold in the shops is only the strength of one ounce avoirdupois to the pint). Slice the opium and pour over it half a pint ($\frac{3}{8}$ viii.) boiling water, and work it with the pestle or hand until it is dissolved into a perfect emulsion, and no lumps can be felt in it, which is done in a very few minutes; then pour it into the bottle, and with two ounces more of warm water rinse your vessels, pestle, and hands, and add this to the above, and then add twenty fluid-ounces of common alcohol, 76 per cent.—Shake it well. In this manner a quart, or any other quantity of laudanum can be made in half an hour, and in twenty-four hours it will be of full and uniform strength. In making each subsequent batch, the dregs of the former one should be poured out upon a paper filter in a funnel, and the alcohol for the new batch be percolated through it, thus preserving all the strength of this costly drug. I find that the Edinburgh College have in the latter editions of their Dispensatory, adopted a plan somewhat similar to the above, but much more troublesome and wasteful.

In the same manner we may advantageously make the tinctures of the gum-resins, as Myrrh, Assafetida, etc.; but in these cases a smaller proportion of water must be employed, unless it be counterbalanced by

using the strong officinal alcohol, as the proper solvent for these gums is a stronger spirit than that required for opium."

TIKTURA ACONITI FOLIORUM. *Tincture of Aconite Leaves.*

Preparation.—Take of Aconite, dried Leaves, *four ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Aconite, in powder, with Diluted Alcohol, allowing it to stand for twenty-four hours, then transferring it to an apparatus for displacement, and gradually pouring upon it Diluted Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—Tincture of Aconite Leaves possesses all the properties of Aconitum Napellus, and may be used wherever the drug is indicated, in doses of from ten to thirty drops. It should not be confounded with the tincture of the root, which is a much more powerful preparation.

TIKTURA ACONITI RADICIS. *Tincture of Aconite Root.*

Preparation.—Take of Aconite Root, in fine powder, *a pound*; Alcohol *two pints*. Macerate for fourteen days, express strongly, and filter through paper.

This Tincture may also be prepared by macerating *a pound* of powdered Aconite Root with a pint of Alcohol for four days, then placing the mixture in a percolator, and adding Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—This is a much stronger preparation than the tincture of the leaves, and care should be employed not to use the two tinctures indiscriminately. It may be used for the same purposes, but in smaller doses, commencing with three drops in a teaspoonful of water, and gradually increasing it to ten or twelve drops.

TIKTURA ALÖES. *Tincture of Aloes.*

Preparation.—Take of Aloes, in powder, *one ounce*; extract of Liquorice *three ounces*; Alcohol *half a pint*; Distilled Water *a pint and a half*. Macerate for fourteen days and filter through paper.

Properties and Uses.—This is a cathartic and tonic, but is seldom used on account of its unpleasant taste; aloes being preferred in the form of pill. As a cathartic, the dose is from half a fluidounce to a fluidounce and a half.

TIKTURA ALÖES ET MYRRHÆ. *Tincture of Aloes and Myrrh. Elixir Proprietatis.*

Preparation.—Take of Aloes, in powder, *three ounces*; Saffron *two ounces*; Tincture of Myrrh *two pints*. Macerate for fourteen days, and filter through paper.

Properties and Uses.—This Tincture is tonic, purgative, and emmenagogue; it has been beneficially employed in chlorosis, and other abnor-

mal conditions of the female system, connected with derangement of the menstrual secretion, and with constipation. It will likewise be found useful as a stimulating laxative, in cold, languid habits, independently of any menstrual difficulty. The dose is one or two fluidrachms.

TINCTURA ARALÆ SPINOSÆ. *Tincture of Prickly Elder.*

Preparation.—Take of Prickly Elder Bark, in powder, *three ounces*; Diluted Alcohol *one pint*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the powdered Bark with Diluted Alcohol, allowing it to stand twenty-four hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until one pint of filtered liquor is obtained.

Properties and Uses.—This Tincture is tonic, stimulant, and alterative; and is efficacious in chronic rheumatism, pulmonary affections, colic, flatulence, cholera-morbus, and Asiatic cholera. It is useful in syphilis, in combination with the Tincture of Turkey-Corn. During the prevalence of cholera in 1849–50–51, it was added to emetic and cathartic medicines, for the purpose of preventing any tendency toward excessive discharges from the bowels. It also serves as a local stimulating application, when properly diluted with strong infusion of Golden Seal, in cases of chronic ophthalmia. The dose is from ten to sixty drops, three or four times a day.

TINCTURA ARNICÆ. *Tincture of Leopard's-bane.*

Preparation.—Take of Arnica flowers *two ounces*; Diluted Alcohol *a pint*. Macerate for one week, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the flowers with Diluted Alcohol, allowing the mixture to stand twenty-four hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol, until one pint of filtered liquor is obtained.

Properties and Uses.—This Tincture is principally used as a local application to sprains, bruises, wounds, etc.; but it may also be used internally in all cases where Arnica would be applicable. The dose is from ten to thirty drops.

TINCTURA ASSAFÆTIDÆ. *Tincture of Assafetida.*

Preparation.—Take of Assafetida *four ounces*; Alcohol *two pints*. Macerate for fourteen days, and filter through paper.—*U. S.*

Properties and Uses.—This Tincture possesses all the virtues of assafetida. The dose is from thirty to sixty drops. Added to water, the resin separates, and the solution becomes milky.

Off. Prep.—Enema Assafætidiæ Composita.

TINCTURA ASSAFÆTIDÆ COMPOSITA. *Compound Tincture of Assafetida.*

Preparation.—Take of Assafetida, Lupulin, Stramonium Seeds, bruised, Valerian Root, in powder, each, *one ounce*; Alcohol *three pints*. Macerate for fourteen days, express, and filter.

Properties and Uses.—This Tincture is used principally in epilepsy, though it will be found useful in hysteria, chorea, and other derangements of the nervous system. The dose is a fluidrachm, repeated every two or three hours, in severe cases; and in ordinary cases, three times a day, to be taken in water, tea, or wine.—*J. K.*

TINCTURA BELLADONNÆ. *Tincture of Belladonna.*

Preparation.—Take of recently dried Belladonna Leaves *four ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Belladonna, in powder, with Diluted Alcohol, allowing it to stand for twenty-four hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—This Tincture possesses all the virtues of Belladonna, when prepared from the recently dried leaves. The dose is from five to thirty drops. When made from the imported leaves, it is less to be relied upon than the extract, on account of their uncertain strength.

TINCTURA BENZOINI COMPOSITA. *Compound Tincture of Benzoin.*

Preparation.—Take of Benzoin *three ounces*; Purified Storax *two ounces*; Balsam of Tolu *one ounce*; powdered Aloes *half an ounce*; Alcohol *two pints*. Macerate for fourteen days, and filter through paper.

Properties and Uses.—This preparation has been known under various names, as *Balsamum Traumaticum*, *Baume de Commandeur*, *Wade's Balsam*, *Friar's Balsam*, *Jesuit's Drops*, etc., and which is used as a stimulating expectorant in chronic catarrhal affections, and as a local application to indolent ulcers. The dose is from thirty drops to two fluidrachms. *Turlington's Balsam*, which is a popular remedy in this country, is made of—Benzoin *twelve ounces*; Storax *four ounces*; Socotrine Aloes *one ounce*; Peruvian Balsam *two ounces*; Myrrh *one ounce*; Angelica root *half an ounce*; Balsam of Tolu *four ounces*; Extract of Liquorice *four ounces*; Alcohol *eight pints*. Digest for ten days and strain. It is an improper application to fresh wounds.

TINCTURA CAMPHORÆ. *Tincture of Camphor.*

Preparation.—Take of Camphor *four ounces*; Alcohol *two pints*. Dissolve the Camphor in the Alcohol.—*U. S.*

Properties and Uses.—This Tincture is stimulant and antispasmodic. It is used externally as an anodyne embrocation in gouty and rheumatic pains, chilblains, and in the inflammation resulting from sprains and bruises. Internally, it is used for various purposes, or wherever a stimulating or antispasmodic action is required. The dose is from five to sixty drops, first added to Sugar, and then mixed with Water.

TINCTURA CAMPHORÆ COMPOSITA. *Compound Tincture of Camphor. Rheumatic Tincture. Rheumatic Drops or Liniment.*

Preparation.—Take of Camphor *one pound*; Oil of Origanum, Oil of Hemlock, of each, *half a pound*; Oil of Sassafras, Oil of Cajeput, of each, *two ounces*; Oil of Turpentine *one ounce*; Capsicum *four ounces*; Alcohol *one gallon*. Macerate for fourteen days, and filter.

Properties and Uses.—This is exceedingly efficacious as an external application, in almost every painful affection; and is of advantage in chronic rheumatism, pains in various parts of the system, bruises, sprains, chilblains, contusions, lameness, numbness, white swelling, and other swellings, etc. In ordinary cases apply two to four teaspoonfuls to the affected part, and rub it well by the fire; and apply warm flannel over the region of the affected part, several times a day. Internally, take twenty drops on Sugar; but in severe and obstinate cases, after bathing as above directed, apply an additional piece of flannel, which must be kept constantly wet with the drops, until relieved. When applied to the teeth, wet a small quantity of cotton, and introduce it into the decaying teeth; if the face is swollen bathe with it likewise.—*J. K.*

TINCTURA CANNABIS INDICÆ. *Tincture of India Hemp.*

Preparation.—Take of Purified Extract of India Hemp *half a drachm*; Alcohol *one fluidounce*. Dissolve the Extract in the Alcohol.

Properties and Uses.—This forms a powerful sedative narcotic, which has been used in neuralgia, cholera, and other symptoms where the India Hemp has been recommended, with much success. The dose is five drops, gradually increased to twenty or forty, according to its influence.

TINCTURA CANTHARIDIS. *Tincture of Spanish Flies.*

Preparation.—Take of Spanish Flies, bruised, *an ounce*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Flies, in powder, with Diluted Alcohol, allowing them to stand for twenty-four hours, then transferring them to a percolator, and gradually pouring upon them Diluted Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—This is the best form for the internal administration of Cantharides, in chronic gonorrhea, gleet, amenorrhea, and some urinary derangements. Externally, it is sometimes used as a rubefacient, but care should be taken to avoid its vesicating action. The dose is from twenty to sixty drops, repeated three or four times a day.

TINCTURA CAPSICI. *Tincture of Cayenne Pepper.*

Preparation.—Take of Cayenne Pepper *an ounce*; Diluted Alcohol *two pints*. Macerate for fourteen days, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Cayenne Pepper, in Powder, with Diluted Alcohol, putting it into a percolator, and gradually pouring upon it Diluted Alcohol, until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—Tincture of Cayenne Pepper is a useful and permanent stimulant, and may be administered in low states of the system with great gastric insensibility, as in typhus fevers and scarlatina maligna, likewise in the cases of drunkards. Diluted with some mucilaginous fluid, it forms a useful gargle, and applied to the relaxed uvula by means of a camel's hair pencil, it frequently affords relief; it is also an excellent application to the eye in cases of chronic ophthalmia. It is frequently applied locally, with advantage, in cases of swellings, rheumatic pains, partial paralysis, atrophied muscles, etc. The dose is from ten to sixty drops in water, three, four, or five times a day, according to the urgency of the case.

TINCTURA CARDAMOMI. *Tincture of Cardamom.*

Preparation.—Take of Cardamom, bruised, *four ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Cardamom, in powder, with Diluted Alcohol, allowing it to stand for twenty-four hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—This Tincture is aromatic and carminative; and is useful in mild colic, flatulency, nausea, gastric debility, etc.; it is also advantageously added as an agreeable aromatic to tonic and purgative mixtures, tinctures, infusions, etc. The dose is one or two fluidrachms.

TINCTURA CARDAMOMI COMPOSITA. *Compound Tincture of Cardamom.*

Preparation.—Take of Cardamom, bruised, *six drachms*; Caraway, bruised, *two drachms*; Cinnamon, bruised, *five drachms*; Raisins, deprived of their seeds, *five ounces*; Cochineal, bruised, *a drachm*; Diluted Alcohol *two pints and a half*. Macerate for fourteen days, express, and filter through paper.—*U. S.*

Properties and Uses.—This is a very agreeable aromatic tincture, and is used for the same purposes as the Tincture of Cardamom, and in the same doses.

TINCTURA CASTOREI. *Tincture of Castor.*

Preparation.—Take of Castor, bruised, *two ounces*; Alcohol *two pints*. Macerate for seven days, express, and filter through paper.—*U. S.*

Properties and Uses.—This Tincture should always be prepared from the Russian castor, if possible; its properties are the same as the castor,

in substance, and it may be given in doses of from thirty minims to two fluidrachms.

TINCTURA CASTOREI AMMONIATA. *Ammoniated Tincture of Castor.*

Preparation.—Take of Castor, bruised, *two ounces and a half*; Assa-fetida, in small fragments, *ten drachms*; Spirit of Ammonia, *two pints* (Imperial Measure). Digest for seven days in a well closed vessel; strain, and strongly express the residuum, and filter.—*Ed.*

Properties and Uses.—This is an active stimulant and antispasmodic, applicable to hysterical and nervous affections unattended with inflammatory symptoms, and severe spasm of the stomach. It may be given in doses of from half a fluidrachm to two fluidrachms.

TINCTURA CATECHU. *Tincture of Catechu.*

Preparation.—Take of Catechu *three ounces*; Cinnamon, bruised, *two ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.—*U. S.*

Properties and Uses.—This forms an astringent tincture, useful in chronic diarrhea, dysentery, etc. The dose is from half a fluidrachm to three fluidrachms, which may be given in sweetened water, some mucilaginous liquid, or in Port wine. On long keeping it sometimes gelatinizes, when it becomes unfit for use.

TINCTURA CAULOPHYLLI COMPOSITA. *Compound Tincture of Blue Cohosh.*

Preparation.—Take of Blue Cohosh Root, in powder, *two ounces*; Ergot, Water Pepper, of each, bruised, *one ounce*; Oil of Savin *half a fluidounce*; Alcohol *one pint and a half*. Macerate for fourteen days, express and filter.

This Tincture may also be prepared by thoroughly moistening the plants with Alcohol, allowing it to stand for twenty-four hours, then transferring it to a percolator, and gradually pouring upon it Alcohol until twenty-three fluidounces and a half of filtered liquor are obtained, to which add the Oil of Savin.

Properties and Uses.—This forms an emmenagogue tincture, very useful in amenorrhea, dysmenorrhea, and other uterine affections. The dose is a fluidrachm two or three times a day.

TINCTURA CIMICIFUGÆ COMPOSITA. *Compound Tincture of Black Cohosh.*

Preparation.—Take of the Saturated Tincture of Black Cohosh *four fluidounces*; Saturated Tincture of Bloodroot *two fluidounces*; Saturated Tincture of Poke Root *one fluidounce*. Mix together.

Properties and Uses.—This is a valuable alterative and expectorant, and appears to exert a specific influence on the lungs, rendering the breathing easy, diminishing the frequency of the pulse, and the general

excitability of the system. It is used in pulmonary affections, hemoptysis, hepatic diseases, dyspepsia, laryngitis, etc. The dose is from half a fluidrachm to a fluidrachm every two or three hours, according to the indications. A very slight degree of nausea produced and maintained by it, will be found to result in the most decided benefit.—*J. K.*

TINCTURA CINCHONÆ. Tincture of Peruvian Bark.

Preparation.—Take of Peruvian Bark, in powder, *six ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Bark with Diluted Alcohol, allowing it to stand for forty-eight hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—This Tincture is chiefly used as an adjunct to other preparations of bark or solutions of quinia. It may be given in the dose of from one to four fluidrachms. However, it is seldom used alone.

TINCTURA CINCHONÆ COMPOSITA. Compound Tincture of Peruvian Bark.

Preparation.—Take of Calisaya Bark, in powder, *four ounces*; Bitter Orange Peel, bruised, *three ounces*; Virginia Snakeroot, in moderately fine powder, *six drachms*; Saffron, chopped, *two drachms*; Cochineal, bruised, *a drachm*; Good French Brandy *twenty fluidounces*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared from the same dry materials, by beating them well together, moistening them thoroughly with the Brandy, allowing the mixture to stand for forty-eight hours, then transferring it to a percolator, and gradually pouring upon it Brandy, until twenty fluidounces of filtered liquor are obtained.

History.—This preparation is generally known by the name of *Huxham's Tincture of Bark*. It is commonly prepared with Diluted Alcohol, instead of Brandy, but I have introduced Brandy as the solvent, more especially on account of the preparation made from it, called *Ferrated Tincture of Peruvian Bark*.

Properties and Uses.—This tincture is an excellent stomachic cordial, and may be used wherever a mild tonic of this character is desired. The dose is from one to four fluidrachms.

TINCTURA CINCHONÆ FERRATA. Ferrated Tincture of Peruvian Bark.

Preparation.—Take of the Compound Tincture of Peruvian Bark *one pint*; Hydrated Sesquioxide of Iron, dried at a temperature not exceeding 130° F., *four drachms*; Ammonio-citrate of Iron *two hundred and fifty-six grains*. To the compound Tincture add the Hydrated Sesquioxide, and digest, until all the Cincho-tannin, whether pure, oxidized, or combined, is completely eliminated. Then filter and wash the Tan-

nate and excess of Oxide with Boiling Alcohol to remove any trace of Alkaloid which may have been precipitated with the Tannin; this Alcoholic Solution may be evaporated to dryness, the product dissolved in a little Water acidulated with Citric Acid, and added to the filtered liquor along with the Ammonio-citrate of Iron.

Properties and Uses.—This forms an exceedingly agreeable, and energetic invigorative, admirably adapted in the cases of weak and languid habits of children and females, where the body is in a pallid or flaccid state, and very susceptible of fatigue or morbid action. It does not solely depend on the quinia and iron it contains for its value as a curative agent; the grateful and by no means inefficient adjuvants, the orange peel, snakeroot, and other proximate principles of cinchona, independent of quinia, are by no means to be overlooked, and cannot be replaced by salts of quinia and iron alone, however scientific their artificial combinations may appear. Each fluidounce contains sixteen grains of ammonio-citrate of iron. The dose is one or two fluidrachms, three or four times a day.—*Saml. Simes.*

• TINCTURA CINNAMOMI. *Tincture of Cinnamon.*

Preparation.—Take of Cinnamon, bruised, *three ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter.

This Tincture may also be prepared by thoroughly moistening the Cinnamon, in powder, with Diluted Alcohol, allowing it to stand for forty-eight hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—Tincture of Cinnamon is an aromatic astringent, and may be used in chronic diarrhea, menorrhagia, uterine hemorrhage, and as an adjuvant to other astringent solutions. The dose is from one to four fluidrachms, in sweetened or mucilaginous liquid.

TINCTURA CINNAMOMI COMPOSITA. *Compound Tincture of Cinnamon.*

Preparation.—Take of Cinnamon, bruised, *an ounce*; Cardamom, Prickly Ash Berries, Ginger, of each, bruised, *three drachms*; Diluted Alcohol *two pints*. Macerate for fourteen days, express and filter through paper.

This Tincture may be prepared from the same dry ingredients; in the state of powder, by moistening them thoroughly with Diluted Alcohol, allowing them to stand for forty-eight hours, then transferring them to a percolator, and gradually pouring upon them Diluted Alcohol until two pints of filtered liquor are obtained.

Properties and Uses.—This is a very warm and agreeable aromatic tincture, useful in flatulence, gastric debility, spasm of the stomach, and chronic diarrhea. The dose is one or two fluidrachms in sweetened water.

TINCTURA COCCI CACTI. *Tincture of Cochineal.*

Preparation.—Take of Cochineal, in fine powder, *two ounces*; Diluted Alcohol *ten fluidounces*. Macerate for fourteen days, express, and filter through paper.

Properties and Uses.—This Tincture is calmative and antispasmodic, and may be given in pertussis, asthma, hysteria, and nervous diseases, in doses of from twenty drops to a fluidrachm. It is also employed for coloring liquid preparations.

TINCTURA COLCHICI SEMINIS. *Tincture of Colchicum Seed.*

Preparation.—Take of Colchicum Seed, bruised, *four ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Colchicum Seed, in powder, with Diluted Alcohol, allowing it to stand for twenty-four hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—This Tincture may be used wherever colchicum is indicated. It is also employed as an external application in gouty, neuralgic, and rheumatic pains. The dose is from thirty drops to two fluidrachms.

TINCTURA COLCHICI COMPOSITA. *Compound Tincture of Colchicum.*

Preparation.—Take of Colchicum Seed, bruised, *two ounces*; Black Cohosh Root, in powder, *three ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the dry materials, in powder, with Diluted Alcohol, allowing it to stand for twenty-four hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until two pints of filtered liquor are obtained.

Or, it may be made by adding together, equal parts of the Tinctures of Colchicum Seed, and Black Cohosh Root.

Properties and Uses.—This forms an excellent agent in inflammatory rheumatism and gout, and has proved a superior remedy in phlegmasia dolens, or the swelled leg of parturient women. The dose is from ten to sixty drops, or more, as circumstances indicate, every one, two, three, or four hours. Iodide of potassium, fifteen grains to the ounce of tincture, may frequently be added with advantage.—*J. K.*

TINCTURA COLOMBÆ. *Tincture of Colombo.*

Preparation.—Take of Colombo, bruised, *four ounces*; Diluted Alcohol *two ounces*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Colombo, in powder, with Diluted Alcohol, allowing it to stand for twenty-four hours, then transferring it to a percolator, and gradually

pouring upon it Diluted Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—This Tincture forms a bitter tonic; it may be added to tonic infusions or decoctions, whenever it is required to slightly increase their stimulant power. The dose is from one to four fluidrachms.

TINCTURA CORYDALIS. *Tincture of Turkey-Corn.*

Preparation.—Take of the Root of Turkey-Corn, in powder, *three ounces*; Diluted Alcohol *one pint*. Macerate for fourteen days, express, and filter.

This Tincture may also be prepared by thoroughly moistening the Turkey-Corn, in powder, with Diluted Alcohol, allowing it to stand forty-eight hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until one pint of filtered liquor is obtained.

Properties and Uses.—This forms an efficient alterative-tonic, useful in all cases where simple tonics are indicated, and highly beneficial in syphilitic, and scrofulous affections. The dose is from twenty drops to two fluidrachms, three or four times a day.

TINCTURA DIGITALIS. *Tincture of Foxglove.*

Preparation.—Take of Foxglove *four ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Foxglove, in powder, with Diluted Alcohol, allowing it to stand for twenty-four hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—This preparation possesses the virtues of Foxglove, and affords a convenient mode of administering that narcotic. The dose is from five to twenty drops, two or three times a day, and increased, if necessary, with much care.

TINCTURA ERGOTÆ. *Tincture of Ergot.*

Preparation.—Take of Ergot of Rye, in coarse powder, *eight ounces*; Diluted Alcohol *twenty fluidounces*. Macerate for fourteen days, express, and then filter.

This Tincture may also be prepared by thoroughly moistening the Ergot, in powder, with Diluted Alcohol, allowing it to stand for twenty-four hours, then transferring it to a percolator, and gradually pouring on Diluted Alcohol until twenty fluidounces of filtered liquor are obtained.

Properties and Uses.—This Tincture may be used in all cases where the action of ergot is indicated or desired. The dose is one or two fluidrachms.

TINCTURA FERRI ACETATIS. *Tincture of Acetate of Iron.*

Preparation.—Take of Sulphate of Iron *eight ounces*, avoirdupois; Distilled Water *half a pint*, (ten fluidounces, Imperial measure); Pure

Sulphuric Acid *six fluidrachms*, (Imp. meas.); Pure Nitric Acid *half a fluidounce*, (Imp. meas.); Acetate of Potassa *eight ounces*, (avoird.); Rectified Spirit *half a gallon*, (Imp. meas.). To nine fluidounces of the Water add the Sulphuric Acid, and in the mixture, with the aid of heat, dissolve the Sulphate of Iron. Add next the Nitric Acid, first diluted with the remaining fluidounce of Water, and evaporate the resulting solution to the consistence of a thick syrup. Dissolve this in one quart (two pints, Imp. meas.), and the Acetate of Potassa in the remainder of the Spirit, and, having mixed the solutions, and shaken the mixture repeatedly in a large bottle, let the whole be thrown upon a calico filter. When any further liquid ceases to trickle through, subject the filter, with its contents, to expression, and having cleared the turbid tincture thus procured by filtration through paper, let it be added to that already obtained. The specific gravity of this tincture is 0.891.—*Dub.*

History.—In the first part of this process the sulphate of protoxide of iron is converted, by the action of the sulphuric and nitric acids, aided by heat, into the tersulphate of the sesquioxide. This is dissolved in half the spirit, and the acetate of potassa in the remaining half, and the two spirituous solutions being mixed, a double decomposition ensues; sulphate of potassa, which is insoluble in rectified spirit, is precipitated, while the teracetate of sesquioxide of iron remains in solution. This, when filtered, constitutes the present tincture of acetate of iron. The whole of the acetate of potassa is decomposed, in consequence of sulphate of iron being added in excess; and the filtration removes not only the sulphate of potassa, but also the excess of the iron salt, which is insoluble in alcohol.

Properties and Uses.—This is a deep-red, transparent liquid, having a strong chalybeate taste. It is tonic and astringent, and beside its internal administration as a chalybeate, it forms an excellent vaginal enema for leucorrhea, when properly diluted with water. The dose of it is from twenty drops to a teaspoonful, given in a sufficient quantity of water.

TINCTURA FERRI CHLORIDI. *Tincture of Chloride of Iron. Tincture of Muriate of Iron.*

Preparation.—Take of Subcarbonate of Iron *half a pound*; Muriatic Acid, sp. gr. 1.16, *a pint*; Alcohol *three pints*. Pour the Acid upon the Subcarbonate of Iron, in a glass or porcelain vessel, mix them, and when effervescence has ceased, apply a gentle heat, and continue it, stirring occasionally, until the carbonate is dissolved; then filter the solution, and mix it with the Alcohol.—*U. S.*

History.—Tincture of Chloride of Iron is a liquid of a reddish-brown, somewhat yellowish color, a sour and exceedingly styptic taste, and an odor somewhat like that of muriatic ether. On exposure to the air, a small deposit of sesquioxide of Iron may take place, rendering the

tincture proportionably feeble, but this can be easily obviated by adding sufficient muriatic acid to dissolve the precipitate. It is *incompatible* with the alkalies, alkaline earths and their carbonates, astringent vegetable infusions, and the mucilage of gum arabic. When the tincture is evaporated, the resulting sesquichloride of iron is of a dark orange color, hardly crystallizable, deliquescent, and composed of two equivalents of iron 56, and three of chlorine $106.26 = 162.26$.

Properties and Uses.—This chalybeate Tincture is tonic, diuretic and astringent. It is very useful in scrofula, gleet, chronic gonorrhea, leucorrhea, dysury dependent on spasmodic stricture, and passive hemorrhage from the uterus, kidneys or bladder. The dose is from ten to thirty drops, two or three times a day, diluted with a sufficient quantity of water. In doses of from ten to twenty drops, in water, and repeated every two hours, the Tincture of Chloride of Iron has been found a valuable agent in the treatment of erysipelas, usually effecting a cure in from two to six days, and during the employment of which, the only local applications necessary are hair powder, and cotton wadding. The bowels to be kept open. Externally, it has proved useful in destroying venereal warts, as a styptic in cancerous and fungous ulcers, and is one of the best applications that can be applied to a venereal chancre. In this last, it should be applied by means of a feather; and a piece of lint moistened with it, should be kept in constant contact with the surface of the ulcer. As an application to chancre, it is the only one that I have made for the last fifteen years, (except the nitric acid during its pustular stage,) and is, in my opinion, decidedly the best local remedy for this kind of ulcer that can be used. Occasionally it causes severe pain, when it should be diluted with as little water as possible, but in the majority of instances after the first or second application, patients hardly notice it. It keeps the chancre clean, its surface soft, and changes the poisonous character of the virus, so that its absorption is followed by no bad result. As the chancre soon becomes so changed, by the uses of this tincture, that it is frequently difficult to detect it from the healthy surrounding integuments, the practitioner must be careful not to be misled by this appearance and cease his internal treatment too soon. Prof. R. S. Newton, to whom I made known this employment of the tincture, and several others, have used it with the most beneficial results.

TINCTURA GELSEMINI. *Tincture of Yellow Jessamine.*

Preparation.—Take of the fresh Root of Yellow Jessamine, cut into small pieces, *eight ounces*; Alcohol *two pints*. Macerate for fourteen days, express and filter. This forms a saturated tincture, beautifully tinged with violet; it has a peculiar odor somewhat resembling that of new honey, and a faint, peculiar, not unpleasant taste.

Properties and Uses.—This Tincture possesses the active properties of the root, and may be given as a febrifuge in intermittent, remittent,

typhus, typhoid, and many other fevers ; it is likewise beneficial in neuralgia, nervous headache, toothache, etc. And combined with tincture of cimicifuga, or tincture of colchicum, it proves decidedly efficacious in rheumatism and gout. In rigidity of the os uteri, puerperal convulsions, puerperal peritonitis, and painful dysmenorrhea, I consider this the very best agent in the *Materia Medica*. I have employed it in all these various conditions and with the most marked success. It is preferable to lobelia as a relaxant, as it does not occasion any nausea or vomiting. To one young lady laboring under a most agonizing dysmenorrhea, I administered a teaspoonful of the tincture every half hour for four hours, before it produced its influence upon her, after which, smaller doses sufficed to maintain its effect, and she suffered no further pain during the menstruation. While it produces a relaxation of the rigid os uteri, it seems to exert an influence on the uterine contractility, promoting this action of the organ. However, I have only noticed this latter effect in a few instances ; further investigations are required before we can place any reliance on this therapeutical action from its administration during parturition. The dose of the tincture of gelsemium is from ten drops to a fluidrachm, according to circumstances, and the urgency of the case. The effects of an overdose may be removed, by holding aqua ammonia to the nostrils, with the internal administration of stimulants.

TINCTURA GENTIANÆ COMPOSITA. Compound Tincture of Gentian.

Preparation.—Take of Gentian, Colombo, Swamp Milkweed, Rhubarb, Prickly Ash Berries, Sassafras, each, in powder, *one ounce* ; Good French Brandy *four pints*. Macerate for fourteen days and filter.

This Tincture may also be prepared from the same dry materials, in the state of powder, by moistening them thoroughly with Brandy, allowing them to stand for forty-eight hours, then transferring them to a percolator, and gradually pouring upon them Brandy until four pints of filtered liquor are obtained.

Properties and Uses.—This is a mild aperient, stimulant, and tonic, and is especially adapted to children with debilitated stomachs, or disordered condition of the digestive organs, after the administration of anthelmintics for the removal of worms, and during convalescence from exhausting diseases, as summer-complaint, diarrhea, dysentery, fevers, etc. The dose is from ten drops to a teaspoonful three or four times a day, in sweetened water.—*J. K.*

TINCTURA GUALACI. Tincture of Guaiacum.

Preparation.—Take of Guaiacum, in powder, *half a pound* ; Alcohol *two pints*. Macerate for fourteen days and filter through paper.—*U. S.*

Properties and Uses.—This Tincture is used in gout, rheumatism, dysentery, amenorrhea, and dysmenorrhea ; the dose is from one to three

fluidrachms, three or four times a day, given in mucilage, or sweetened water. *Dewees' Tincture of Guaiacum*, (*Tinctura Guaiaci Alkalina*,) recommended in suppression of the menses and dysmenorrhea, is made as follows: Take of the best Guaiac, in powder, *four ounces*; Carbonate of Soda or of Potassa, *one drachm and a half*; Pimento, in powder, *an ounce*; Diluted Alcohol *a pound*. Digest for a few days. Dose, a teaspoonful three times a day, to be gradually increased, if necessary.

TINCTURA GUAIACI AROMATICA. *Aromatic Tincture of Guaiacum. Greenhow's Cholera Mixture.*

Preparation.—Take of Guaiacum, Cloves, and Cinnamon, each, in powder, *one ounce*; Brandy *two pints*. Macerate for fourteen days and filter.

Properties and Uses.—This Tincture is an excellent aromatic stimulant, astringent, and diaphoretic. It was extensively used in Cincinnati, by the Eclectics, during the cholera of 1849–50–51, and with excellent effect. The late Prof. T. V. Morrow, considered it as one of the best agents in the treatment of that disease. The dose is from a teaspoonful to a tablespoonful, in sweetened water, every fifteen or twenty minutes, until relief is obtained. The addition of an ounce of Prickly Ash Berries to this tincture will materially enhance its value.

TINCTURA HYDRASTIS. *Tincture of Golden Seal.*

Preparation.—Take of Golden Seal Root, in powder, *three ounces*; Diluted Alcohol *one pint*. Macerate for fourteen days, express and filter.

This Tincture may also be prepared by thoroughly moistening the Golden Seal Root, in powder, with Diluted Alcohol, allowing it to stand for forty-eight hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until two pints of filtered liquor are obtained.

Properties and Uses.—This Tincture is tonic, and will be found beneficial in chronic gastric affections, hepatic diseases, chronic diarrhea, and general debility. Diluted and applied locally, it forms an efficacious remedy in leucorrhœa, and ophthalmia. The dose is from ten to sixty drops, two or three times a day, in water.

TINCTURA HYDRASTIS COMPOSITA. *Compound Tincture of Golden Seal.*

Preparation.—Take of Golden Seal Root, Lobelia Seed, each, in powder, *two ounces*; Diluted Alcohol *one pint*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared from the same dry materials, in powder, by moistening them thoroughly with Diluted Alcohol, allowing them to stand for forty-eight hours, then transferring them to a percolator, and gradually pouring upon them Diluted Alcohol until one pint

of filtered liquor is obtained. Or, it may be made by adding together equal parts of the Tinctures of Golden Seal, and Lobelia.

Properties and Uses.—This is a valuable local application to diseased mucous surfaces. It is highly recommended by Prof. Z. Freeman, in chronic catarrh, to be snuffed up into the nostrils, or applied by means of a camel's hair pencil; it is also useful in chronic ophthalmic diseases, diluted with water.—*Z. F.*

TINCTURA HYOSCYAMI. *Tincture of Henbane.*

Preparation.—Take of Henbane Leaves *four ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Henbane Leaves, in powder, with Diluted Alcohol, allowing them to stand for twenty-four hours, then transferring them to a percolator, and gradually pouring upon them Diluted Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—This Tincture is anodyne and soporific, and may be used as a substitute for Opium in cases where this latter drug disagrees, or where its constipating effects are not desired. Sometimes the Tincture of Henbane purges; when this is the case, a small portion of laudanum may be added to it. The dose is from half a fluidrachm to a fluidrachm.

TINCTURA HYPERICI. *Tincture of St. John's Wort.*

Preparation.—Take of the Blossoms of St. John's Wort (recent) *five ounces*; Alcohol *one pint*. Macerate for fourteen days, express, and filter.

Properties and Uses.—This Tincture may be used to fulfill the indications of the plant; but its principal use is as a local application to wounds, bruises, ulcers, swellings, tumors, ecchymosis, etc. The dose internally is from half a fluidrachm to a fluidrachm. As a local application it is equal to Arnica.

TINCTURA IODINII. *Tincture of Iodine.*

Preparation.—Take of Iodine *an ounce*; Alcohol *a pint*. Dissolve the Iodine in the Alcohol.—*U. S.*

History.—The Tincture of Iodine should be kept in well stopped bottles, and not exposed to the light, and it is better to make up but small quantities at a time, as a reaction takes place between the iodine and alcohol, producing chemical changes, especially if the tincture be exposed to the action of light. In preparing the tincture the iodine should be well dried. It has a deep brown color, becomes gradually decomposed on standing, or on the addition of water.

Properties and Uses.—This preparation is seldom administered internally, on account of its liability to precipitation in the stomach, and

consequent irritation produced by the crude iodine. When given, the dose is ten drops, gradually increased to thirty, two or three times a day, to be administered in sweetened water, or still better, wine, if not contra-indicated. Thirty drops are about equal to one grain of iodine. Its principal use is externally, in erysipelas, chilblains, and several cutaneous diseases—it has likewise been recommended as a local application in local rheumatism, croup, bites of serpents, etc. It may be applied by means of a camel's hair pencil.

TINCTURA IODINII COMPOSITA. *Compound Tincture of Iodine.*

Preparation.—Take of Iodine *half an ounce*; Iodide of Potassium *an ounce*; Alcohol *a pint*. Dissolve the Iodine and the Iodide of Potassium in the Alcohol.—*U. S.*

Properties and Uses.—This Tincture may be used internally for all the purposes to which iodine is applicable. Unlike the Tincture of Iodine, it is not decomposed when diluted with water. The dose is five drops, three times a day, gradually increased to thirty if necessary.

TINCTURA IRIDIS. *Tincture of Blue Flag.*

Preparation.—Take of Blue Flag Root, in powder, *three ounces*; Alcohol *a pint*. Macerate for fourteen days, express, and filter.

This Tincture may also be prepared by thoroughly moistening the Blue Flag Root, in powder, with Alcohol, allowing them to stand for forty-eight hours, then transferring them to a percolator, and gradually pouring upon them Alcohol, until one pint of filtered liquor is obtained.

Properties and Uses.—The Tincture of Blue Flag possesses the same alterative and cathartic properties as the root, and may be used in all cases as a substitute for the powder, in doses of from ten to sixty drops, according to the effect desired, two or three times a day. Six fluidrachms, each, of the Tinctures of Blue Flag, and Mandrake roots, with two fluidrachms of a saturated tincture of Nux Vomica, form an efficacious remedy in obstinate constipation, hepatic torpor, derangements of the spleen, sick headache, want of appetite, syphilitic affections, gleet, recent stricture of the urethra, impotency from masturbation, recent disease of the prostate, etc. The mixture may be given in doses of from ten to fifteen drops, in water, two or three times a day.

TINCTURA KALMIÆ. *Tincture of Sheep Laurel.*

Preparation.—Take of Sheep Laurel Leaves *three ounces*; Diluted Alcohol *one pint*. Macerate for fourteen days, express, and filter.

This Tincture may also be prepared by thoroughly moistening the Sheep Laurel Leaves, in powder, with Diluted Alcohol, allowing it to stand for twenty-four hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until one pint of filtered liquor is obtained.

Properties and Uses.—This preparation is sedative and alterative, and may be successfully used in jaundice, syphilitic diseases, palpitation of the heart, etc., in doses of ten drops, carefully and gradually increased to thirty. In obstinate syphilitic affections, I frequently add a portion of this tincture to the Compound Syrup of Stillingia, with marked advantage. Externally, the tincture is beneficial in itch, and some other cutaneous affections.

TINCTURA KINO. *Tincture of Kino.*

Preparation.—Take of Kino, in powder, *three ounces and a half*; Distilled Water *twelve fluidounces*; Alcohol *twenty fluidounces*. Macerate for fourteen days, and filter.

This Tincture may also be prepared by mixing with the powdered Kino, an equal bulk of Sand, transferring the mixture to a percolator, and gradually pouring upon it the above proportions of Alcohol and Distilled Water, mixed together, until two pints of filtered liquor are obtained.

Properties and Uses.—Tincture of Kino is astringent, and is principally used in diarrhea, cholera morbus, cholera, etc., in doses of one or two fluidrachms; it is frequently added to astringent mixtures. It is very liable to gelatinize on standing, and lose its astringency, especially if exposed to the action of the atmosphere; hence, it should be made frequently, in small quantities at a time, and be kept in well stopped bottles.

TINCTURA KRAMERIE. *Tincture of Rhatany.*

Preparation.—Take of Rhatany, in powder, *six ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by moistening the Rhatany thoroughly with Diluted Alcohol, allowing it to stand for forty-eight hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—This is useful in chronic diarrhea, and other cases where an astringent is required. It likewise forms an excellent local application to the gums, where they are tender, spongy, and bleed. The dose is one or two fluidrachms in sweetened water, or wine, if not contra-indicated, three or four times a day.

TINCTURA LARICIS COMPOSITA. TINCTURA PINUS PENDULÆ COMPOSITA. *Compound Tincture of Tamarac. Bone's Bitters.*

Preparation.—Take of Tamarac Bark, Juniper Berries, of each, *six ounces*; Prickly Ash Bark *four ounces*; Wild Cherry Bark, Seneca Snakeroot, of each, *three ounces*; Tansy *one ounce*; Whisky *five pints*; Molasses *a pint and a half*; Hydro-alcoholic Extract of Mandrake *an ounce and a half*; Water *a sufficient quantity*. Let the medicinal Herbs,

Roots, and Barks, be coarsely pulverized and mixed together. To the mixture add *three pints* of the Whisky, and let them stand twenty-four hours; then place the whole in a vapor displacement apparatus, and force through the articles the steam, or vapor of the additional Whisky *two pints*, after which the steam from Water sufficient to make the whole amount of Tincture equal to *twenty-four pints*. To this add the Molasses, and the Hydro-alcoholic Extract of Mandrake; which last must be thoroughly dissolved.

Properties and Uses.—Although not properly a tincture, yet to avoid a new class of pharmaceutic agents, *bitters*, I place this compound among the tinctures. It is an improvement upon the original Bone's Bitters, and is now generally preferred by Eclectics. It possesses nearly four times the strength of that heretofore made, and consequently must be taken in a much smaller dose, a desideratum with all medicines containing alcohol. The whisky and juniper berries are less expensive, and more readily obtainable than the pure Holland Gin recommended in the original, and likewise render the preparation more actively diuretic; and the substitution of the Extract of Mandrake, for the bitter, and to many patients, unbearable taste of aloes, renders it much more valuable as a cholagogue, alterative, and aperient. It forms an excellent alterative tonic and aperient for dyspepsia, menstrual obstructions, and other diseases where such a combination of action is indicated. The dose is half a fluidounce, three times a day, about an hour previous to each meal.

TINCTURA LAVANDULÆ COMPOSITA. *Compound Spirit of Lavender.*

Preparation.—Take of Oil of Lavender *three fluidrachms*; Oil of Anise *one drachm and a half*; Cloves, in powder, *one ounce*; Mace *three drachms*; Red Saunders *two ounces*; Brandy *four fluidounces*; Jamaica Rum *one gallon*. Macerate for fourteen days, express, and filter through paper.

Properties and Uses.—This is far superior to, and makes a much more agreeable compound than the formula of the U. S. Pharmacopœia. It forms a delightful preparation which is much employed as a remedy for flatulence, hysteria, gastric uneasiness, nausea, and general languor or faintness. It is also used as an adjuvant and corrigent of other medicines. The dose is from thirty drops to a fluidrachm or two, given in sweetened water, or on sugar.—*J. K.*

TINCTURA LEPTANDRÆ. *Tincture of Blackroot.*

Preparation.—Take of Black Root, in powder, *three ounces*; Diluted Alcohol *one pint*. Macerate for fourteen days, express, and filter.

This Tincture may also be prepared by thoroughly moistening the Black Root, in powder, with Diluted Alcohol, allowing it to stand for forty-eight hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until one pint of filtered liquor is obtained.

Properties and Uses.—This preparation is aperient and cholagogue, and is employed in various derangements of the biliary organs; it is also added to medicines for summer-complaint, chronic diarrhea, remittent fever, etc. The dose is from half a fluidrachm to two fluidrachms, two or three times a day.

TINCTURA LOBELIÆ. *Tincture of Lobelia.*

Preparation.—Take of Lobelia, (the herb), *four ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by adding Diluted Alcohol to the Lobelia, in powder, and allowing it to stand for twenty-four hours, or until thoroughly moistened, then transferring the whole to a displacer, and gradually adding to it Diluted Alcohol until two pints of filtered liquor have passed.

Properties and Uses.—This Tincture possesses the same properties as Lobelia; the dose is from thirty to sixty drops as a nauseant; and half a fluidounce, or more, as an emetic. A tincture prepared of equal parts of vinegar and alcohol, instead of diluted alcohol, is preferable to the above, in cases where it is not to be kept for a length of time. Externally, the tincture of lobelia is beneficial as a local application in tetter, and similar cutaneous eruptions, stings of insects, and in the poisoning by Rhus.

TINCTURA LOBELIÆ COMPOSITA. *Compound Tincture of Lobelia.* Dr. J. King's Expectorant Tincture.

Preparation.—Take of Lobelia, (herb), Bloodroot, Skunk Cabbage Root, Wild Ginger Root, and Pleurisy Root, each, coarsely powdered, *one ounce*; Water, (or Vinegar), *one pint*; Alcohol *three pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared from the same dry materials, in powder, by thoroughly moistening them with Alcohol diluted as above, allowing them to stand for forty-eight hours, then transferring them to a percolator, and gradually pouring upon them Alcohol diluted as above with Water, (or Vinegar), until four pints of filtered liquor have been obtained.

Properties and Uses.—This Tincture forms an excellent emetic for children and infants, and may be safely used in croup, whooping-cough, bronchitis, asthma, convulsions, and in all cases where an emetic is required. It will likewise be found beneficial as an expectorant, or nauseant in coughs, pleuritic affections, asthma, pertussis, and whenever expectorants are indicated. It is among the most valuable of Eclectic remedies.

In croup, for children one year old, give half a tablespoonful in a tablespoonful of molasses, and repeat it every fifteen minutes, until it vomits; after which, a teaspoonful may be given every hour or two, as required—the vomit to be repeated two or three times a day. A child

from two to six months old, may take from half to a teaspoonful for a dose; less than two months old, from fifteen to twenty-five drops, to be repeated every ten minutes, if vomiting is required. Children from three to six years old, may take a tablespoonful, in molasses or warm water, every ten minutes, until it vomits. Warm boneset or thoroughwort tea, ought always to be given in order to facilitate its operation as an emetic.

For cough, asthma, etc., to promote expectoration and remove tightness across the chest; and in all ordinary cases where an expectorant is required, adults may take one or two teaspoonfuls in half a wineglassful of slippery elm tea, three to five times a day, or as often as required. Children from one year old to ten, may take from half to a teaspoonful in the same manner; and for those less than one year, from ten to thirty drops. Should the above doses vomit, they should be lessened, except when vomiting is desired. The stomach and bowels must be kept regular in all cases, by gentle medicines.

TINCTURA LOBELIÆ ET CAPSICI COMPOSITA. *Compound Tincture of Lobelia and Capsicum. Antispasmodic Tincture.*

Preparation.—Take of Lobelia, Capsicum, and Skunk Cabbage Root, each, in powder, *two ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter.

This Tincture may also be prepared from the same dry materials, in powder, by thoroughly moistening them with Diluted Alcohol, allowing them to stand for forty-eight hours, then transferring them to a percolator, and gradually pouring upon them Diluted Alcohol until two pints of filtered liquor are obtained.

Or, it may be made by combining together, equal parts of the saturated tinctures of Lobelia, Capsicum, and Skunk Cabbage Root.

Properties and Uses.—This Tincture is a powerful antispasmodic and relaxant, and will be found highly efficacious in cramps, spasms, convulsions, tetanus, etc. The dose is from half a teaspoonful to a teaspoonful, every ten or twenty minutes, or as often as the urgency of the case requires.

In convulsions and tetanus, it may be poured into the corner of the mouth, and repeated as often as necessary; generally, the effect is almost instantaneous. This valuable preparation should always be in the possession of every physician. In rigidity of the os uteri, a teaspoonful administered by mouth, or by enema into the rectum, and repeated in fifteen or twenty minutes, will be found to produce a state of softness and dilatibility without the necessity of using the lancet, so highly recommended by a certain class of practitioners, in such cases.

TINCTURA LUPULINI. *Tincture of Lupulin.*

Preparation.—Take of Lupulin *four ounces*; Alcohol *two pints*. Macerate for fourteen days and filter through paper.—*U. S.*

Properties and Uses.—Lupulin is the active principle of hops, and as the quantity of it varies in different specimens of hops, a tincture of it is decidedly preferable to one made of hops. It may be employed with advantage in coughs, after-pains, and in all cases where opium is inadmissible. The dose is one or two fluidrachms in mucilage or sweetened water.

TINCTURA MENTHÆ VIRIDIS. *Tincture of Spearmint. Spirits of Mint.*

Preparation.—Take of the fresh Herb of Spearmint a sufficient quantity to fill a glass jar, and cover with good Holland Gin. Macerate for seven days, express, and filter.

Properties and Uses.—This Tincture is diuretic and stimulant. It may be beneficially employed in strangury, retention of urine, gravel, and various chronic nephritic diseases. The dose is from two to four ounces, three times a day; but in severe and painful cases it may be repeated every half hour or hour until relief is obtained. Externally, it forms an excellent application to hemorrhoids when in a state of inflammation; cotton must be moistened with it, and applied to the part.

TINCTURA MYRRHÆ. *Tincture of Myrrh.*

Preparation.—Take of Myrrh, bruised, four ounces; Alcohol three pints. Macerate for fourteen days and filter through paper.—U. S.

Properties and Uses.—Tincture of Myrrh is chiefly employed as a local application to stimulate foul and indolent ulcers, and to promote the exfoliation of bones; and, diluted with water, it may be advantageously applied to spongy gums, aphthous sore mouth, and ulcerations of the throat; occasionally it is employed internally as an emmenagogue, and stimulant expectorant, in doses of from half a fluidrachm to a fluidrachm.

TINCTURA MYRRHÆ COMPOSITA. *Compound Tincture of Myrrh. Hot Drops.*

Preparation.—Take of Myrrh, bruised, eight ounces; Capsicum two ounces; Alcohol one gallon. Macerate for fourteen days and filter.

Properties and Uses.—Eclectics very rarely employ this preparation internally; occasionally, however, it is used in cases of nausea, gastric distress, especially after a hearty meal, flatulence, etc., in doses of from half a fluidrachm to a fluidrachm in sweetened water. Its internal employment is contra-indicated when inflammation is present. Its principal use is externally, when it proves an excellent local application to sprains, bruises, fresh wounds, cuts, rheumatism, offensive ulcers, etc.

TINCTURA NUCIS VOMICÆ. *Tincture of Nux Vomica.*

Preparation.—Take of Nux Vomica, rasped, two ounces; Alcohol eight fluidounces. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Nux Vomica, in powder, with Alchoh', allowing it to stand for forty-

eight hours, then transferring it to a percolator, and very gradually pouring Alcohol upon it until eight fluidounces of filtered liquor are obtained.

Properties and Uses.—This Tincture possesses the properties of the nux vomica, but as the seeds vary in their quantity of active matter, it is an inferior preparation to the tincture of strychnia, or alcoholic extract of nux vomica. Its extreme bitterness is a great objection to its employment. It is occasionally employed in doses of from five to twenty drops; and as an external application in local paralysis.

TINCTURA OLEI ANISI. *Tincture of Oil of Anise. Essence of Anise.*

Preparation.—Take of Oil of Anise *one fluidounce*; Alcohol *nine fluidounces*. Mix with agitation.—*Dub.*

Properties and Uses.—This preparation is aromatic, antispasmodic, and carminative, and may be employed in flatulency, cough, cramp of the stomach, and to flavor other preparations. The dose is from twenty to sixty drops for an adult, in sweetened water. The following forms a very pleasant preparation for cough: Take of Aqua Ammonia, Tincture of Opium, each, *one fluidounce*; Essence of Anise, *half a fluidounce*. Mix. Dose, from twenty to sixty drops.

TINCTURA OLEI CARUI. *Tincture of Oil of Caraway. Essence of Caraway.*

Preparation.—Take of Oil of Caraway *one fluidounce*; Alcohol *nine fluidounces*. Mix with agitation.—*Dub.*

Properties and Uses.—This is aromatic, carminative, and antispasmodic. It may be used in flatulency, nausea, etc., and to flavor mixtures. The dose is from twenty to sixty drops in sweetened water.

TINCTURA OLEI CINNAMOMI. *Tincture of Oil of Cinnamon. Essence of Cinnamon.*

Preparation.—Take of Oil of Cinnamon *one fluidounce*; Alcohol *nine fluidounces*. Mix with agitation.—*Dub.*

Properties and Uses.—This Tincture possesses the stimulant and aromatic properties of cinnamon; and may be beneficially employed in menorrhagia and uterine hemorrhage, in which, a teaspoonful may be taken in a wineglass of sweetened water, every five, ten, or thirty minutes, according to the urgency of the symptoms.

TINCTURA OLEI MENTHÆ PIPERITÆ. *Tincture of Oil of Peppermint. Essence of Peppermint.*

Preparation.—Take of Oil of Peppermint *two fluidounces*; Alcohol *a pint*. Dissolve the Oil in the Alcohol.—*U. S.*

Properties and Uses.—Tincture of Oil of Peppermint, more commonly known as *Essence of Peppermint*, is carminative and antispasmodic. It may be used in nausea, colic, flatulency, cramp or gripings of the

bowels, etc. The dose is from ten to thirty drops on sugar, or mixed with sweetened water.

TINCTURA OLEI MENTHÆ VIRIDIS. *Tincture of Oil of Spearmint. Essence of Spearmint.*

Preparation.—Take of Oil of Spearmint *two fluidounces*; Alcohol *a pint*. Dissolve the Oil in the Alcohol.—*U. S.*

Properties and Uses.—This preparation is antispasmodic, carminative, and diuretic, and may be employed similarly to the essence of peppermint. The dose is from twenty to forty drops on sugar, or mixed with sweetened water.

TINCTURA OLEI SASSAFRAS. *Tincture of Oil of Sassafras. Essence of Sassafras.*

Preparation.—Take of Oil of Sassafras *two fluidounces*; Alcohol *a pint*. Dissolve the Oil in the Alcohol.

Properties and Uses.—This Tincture is stimulant, carminative, diuretic, and alterative. Its principal use is to flavor syrups and other fluid preparations. The dose is from ten to thirty drops on sugar, or mixed with sweetened water.

TINCTURA OPII. *Tincture of Opium. Laudanum.*

Preparation.—Take of good Turkey Opium, sliced, *twelve hundred grains*; Boiling Water *ten fluidounces*; Alcohol 76 p. ct., *twenty fluidounces*. Pour eight fluidounces of the Boiling Water on the Opium, and with the hand or pestle, reduce it to an emulsion; then pour it into the bottle in which it is to be kept, rinse the pestle or hand with the remaining two fluidounces of Warm Water, and add it to the fluid in the bottle, together with the Alcohol. Agitate well, and set it aside; in twenty-four hours it will be of full strength. (See Mr. Merrell's remarks on Tinctures, page 1241-2.)

Properties and Uses.—This Tincture possesses the medicinal virtues of opium, and may be used in all cases where the drug is indicated, in doses of from ten to forty drops. Twenty-five drops are about equal to one grain of opium.

If Diluted Acetic Acid be employed in the above formula instead of Water, it will form a much better tincture, and one less liable to vary in strength—the TINCTURA OPII ACETATA, or *Acetated Tincture of Opium*, and which may be given in the same doses as above.

The following is offered to the profession by Eugene Dupuy, Pharmacist, of New York, as a substitute for *McMunn's Elixir of Opium*, (a trial of six years has been accorded to it, and none of the unpleasant effects attributed to Laudanum have as yet attended its administration): Take of Opium *ten drachms*, make it into a thin pulp with a sufficient quantity of water; then allow the mixture to stand in a cool place forty-eight hours; after which transfer it into an elongated glass funnel

containing filtering paper, and add a superstratum of Water equivalent to the bulk of the whole mass. When twelve ounces of liquid have filtered, add to the filtered solution, Alcohol, 95 per cent., *four ounces*. The solution is an Aqueous Solution of Opium, nearly free from narcotina, preserved by alcohol, and contains about two-thirds of the substance of the Opium—the residue consisting chiefly of resin, narcotina, caoutchouc, ligneous matter, etc.

For a similar purpose, the following mode of preparation is recommended in the *American Journal of Pharmacy* :

Macerate *ten drachms* (Troy) of Opium, in *half a pint* of Water, for two days, and express; subject the dregs to two successive macerations, using *six fluidounces* of Water each time, with expression; mix and strain the liquors, evaporate them to two fluidounces, and agitate the liquid with Sulphuric Ether *four fluidounces*, several times during half an hour. Then separate the Ether by means of a funnel, evaporate the solution of Opium to dryness, dissolve the Extract in *half a pint* of Cold Water, pour the Solution on a filter, and after it has passed wash the filter with sufficient water to make twelve fluidounces of filtered Solution, to which add *four fluidounces* of Alcohol.

By this process the Ether removes all that the Water has dissolved of the thebaine, the meconin, a part of the codeia, the odorous principle, meconate of narcotine, and fatty matter. The evaporation to dryness, and re-solution in Water, removes the ethereal odor, and separates a portion of acid, resin, and extractive.

TINCTURA OPII CAMPHORATA. *Camphorated Tincture of Opium. Paregoric Elixir.*

Preparation.—Take of Opium *one drachm*, reduce it to an emulsion in Boiling Water *one fluidounce*, then add Benzoic Acid *a drachm*; Oil of Anise, *a fluidrachm*; Clarified Honey *two ounces*; Camphor *two scruples*; Alcohol 76 per ct., *twenty-two fluidounces*; Distilled Water *nine fluidounces*. Macerate for fourteen days, and filter through paper.

Properties and Uses.—This is a pleasant anodyne and antispasmodic; used to allay cough, in asthma, pertussis, chronic catarrh, and consumption; to relieve nausea and slight pains in the stomach and bowels; to check diarrhea, and to procure sleep.

The dose for an adult, is one or two fluidrachms; for an infant, from five to ten or twenty drops.

The nostrums known by the names of *Bateman's Drops*, and *Godfrey's Cordial*, two very dangerous articles in the hands of nurses and many non-professional persons, are generally prepared as follows: *Bateman's Pectoral Drops*, take Opium, in powder, Catechu, in powder, Camphor, Red Saunders, rasped, each, *two ounces*; Oil of Anise *four fluidrachms*; Diluted Alcohol *four gallons*. Digest for ten or twelve

days. It is about equal in strength to the Camphorated Tincture of Opium, one fluidounce being about equal to two grains of Opium.

Godfrey's Cordial. Dissolve Carbonate of Potassa *two ounces and a half*, in Water, *twenty-six pints*; add Molasses from the Sugar Refiners, *sixteen pints*, and heat over a gentle fire till they simmer; take off the scum which arises, and add a mixture of Laudanum *a pint and a half*, and Oil of Sassafras four fluidrachms. A fluidounce of this preparation contains rather more than a grain of opium.

The coroner of Nottingham states, that "Godfrey's Cordial is given to children to a great extent; and that he has no doubt whatever that many infants are yearly destroyed in that borough, but who dying gradually, never come under his notice officinally." There can be no doubt of the truth of this assertion. At all events we can say positively that such instances occur elsewhere.—(*Dunghlison's Am. Med. Lib. and Intell.*, Jan. 1840, p. 299.)

TINCTURA PODOPHYLLI. *Tincture of Mandrake.*

Preparation.—Take of Mandrake Root, in powder, *three ounces*; Alcohol *one pint*. Macerate for fourteen days, express, and filter.

This Tincture may also be prepared by thoroughly moistening the Mandrake, in powder, with Alcohol, allowing it to stand for forty-eight hours, then transferring it to a percolator, and gradually pouring upon it Alcohol until one pint of filtered liquor is obtained.

Properties and Uses.—This Tincture possesses the alterative, cholagogue, purgative, and other properties of the root, and may be used wherever that is indicated. The dose is from ten to sixty drops.

TINCTURA POLYGONI. *Tincture of Water Pepper.*

Preparation.—Take of Water Pepper, the fresh Herb, *a sufficient quantity*, to fill a quart jar; then add Holland Gin, or Proof Spirit, as much as can be held in the jar. Macerate for seven days, express and filter.

This Tincture may likewise be made from the dried herb, in powder, *six ounces to one pint and a half* of Proof Spirit, and macerating for fourteen days; or by percolation.

Properties and Uses.—This Tincture has been used with efficacy in amenorrhea, dysmenorrhea, suppressed lochial discharge, and in moderate menorrhagia. The dose is a teaspoonful three or four times a day.

TINCTURA QUININÆ COMPOSITA. *Compound Tincture of Quinia. Ague Bitters.*

Preparation.—Take of Quinia *thirty grains*; Cream of Tartar *one ounce*; Cloves, in powder, *one ounce*; Whisky *one pint*. Macerate for twenty-four hours, and filter.

Properties and Uses.—This Tincture is febrifuge, antiperiodic, and tonic, and is used in intermittent and remittent fevers, and other diseases attended with symptoms of a periodical character. In intermittent fever,

the dose for an adult is half a fluidounce every hour during the intermission, until two or three hours previous to the return of the next expected chill, when the dose should be given every half hour. The dose for children is one or two fluidrachms.—*T. V. M.*

TINCTURA RHEI. Tincture of Rhubarb.

Preparation.—Take of Rhubarb, bruised, *three ounces*; Cardamom Seeds, bruised, *half an ounce*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Rhubarb and Cardamom, in powder, with Diluted Alcohol, allowing them to stand for forty-eight hours, then transferring them to a percolator, and gradually pouring upon them Diluted Alcohol until two pints of filtered liquor are obtained.

Properties and Uses.—This Tincture is purgative, stomachic, and tonic. It is principally used in flatulent colic, dyspepsia, constipation, and in low forms of fever. The dose, as a purgative, is from half a fluidounce to a fluidounce; as a stomachic, one, two, or three fluidrachms.

TINCTURA RHEI COMPOSITA. Compound Tincture of Rhubarb.

Preparation.—Take of Rhubarb, bruised, *four ounces*; Bitter Root, Golden Seal, Gentian, Prickly Ash Berries, of each, bruised, *two ounces*; Sassafras, Cardamom Seeds, of each, *one ounce*; Diluted Alcohol *five pints*. Macerate for fourteen days, express, and filter.

This Tincture may also be prepared from the dry materials in the state of powder, by thoroughly moistening them with Diluted Alcohol, allowing them to stand for forty-eight hours, then transferring the mixture to a percolator, and gradually adding Diluted Alcohol, until five pints of filtered liquor are obtained.

Properties and Uses.—Compound Tincture of Rhubarb is laxative, tonic, and stomachic; it is especially useful in debilitated conditions of the digestive organs, hepatic torpor, dyspepsia, constipation, and to restore the tone of the bowels after the removal of worms, after diarrheas, dysenteries, etc. The dose is from half a fluidounce to a fluidounce, two or three times a day in sweetened water, or sufficient to procure one, but not over two alvine evacuations daily.—*J. K.*

TINCTURA SANGUINARIÆ. Tincture of Bloodroot.

Preparation.—Take of Bloodroot, in powder, *six fluidounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Bloodroot, in very fine powder, with Diluted Alcohol, allowing it to stand for forty-eight hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—In the dose of three or four fluidrachms, this tincture will prove emetic ; and from ten to sixty drops will act as a nauseant, expectorant, stimulant, and alterative. As all the medicinal virtues of bloodroot are taken up by Alcohol, I do not see the necessity of using this liquid diluted. For several years past I have been accustomed to prepare this tincture with undiluted alcohol, which I have found to give a much better medicinal solution, and to be more satisfactory in its effects.

TINCTURA SANGUINARIÆ ACETATA COMPOSITA. *Compound Acetated Tincture of Bloodroot. Acetous Emetic Tincture.*

Preparation.—Take of Bloodroot, Lobelia, Skunk Cabbage Root, each, in powder, *two ounces* ; Distilled Vinegar *two pints* ; Alcohol *two fluid-ounces*. Macerate the drugs and Vinegar together, in a close glass vessel, for fourteen days, then express, filter, and to the filtered liquor add the Alcohol.

This Tincture may also be prepared from the dry materials in powder, by thoroughly moistening them with Distilled Vinegar, allowing them to stand for forty-eight hours, then transferring them to a percolator, and gradually pouring Distilled Vinegar upon them until two pints of filtered liquor are obtained, to which add the Alcohol.

Properties and Uses.—This preparation is much used by Eclectics as an emetic and expectorant, in all cases where such agents are required. As an emetic, the dose is from one to four fluidrachms, in some sweetened aromatic infusion, to be repeated every ten or fifteen minutes until vomiting is produced ; as an expectorant the dose is from twenty to sixty drops, every hour or two. It also forms a useful external application to erysipelas, tetter, and other forms of cutaneous disease.

TINCTURA SANGUINARIÆ COMPOSITA. *Compound Tincture of Bloodroot. Emetic Tincture.*

Preparation.—Take of Bloodroot, Lobelia, Skunk Cabbage Root, each, in powder, *two ounces* ; Diluted Alcohol *two pints*. Macerate in a close glass vessel for fourteen days, express, and filter.

This Tincture may also be prepared from the dry materials in powder, by thoroughly moistening them with Diluted Alcohol, allowing them to stand for forty-eight hours, then transferring them to a percolator, and gradually pouring Diluted Alcohol upon them until two pints of filtered liquor are obtained.

Properties and Uses.—This Tincture is used for the same purposes, in the same manner and dose, as the preceding one.

TINCTURA SENNÆ COMPOSITA. *Compound Tincture of Senna. Elixir Salutis.*

Preparation.—Take of Alexandria Senna *two ounces* ; Jalap, in powder, *one ounce* ; Fennel Seeds, bruised, *half an ounce* ; Best French

Brandy *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared from the dry materials in powder, by thoroughly moistening them with Brandy, allowing them to stand for forty-eight hours, then transferring them to a percolator, and gradually pouring Brandy upon them until two pints of filtered liquor are obtained.

Properties and Uses.—This is an excellent purgative, especially for children, as it acts mildly and pleasantly; it is also useful in cases of constipation attended with flatulence. The dose for an adult is from half a fluidounce to a fluidounce; for a child a year old, a fluidrachm. It may be given in a little sweetened water.

TINCTURA SERPENTARIÆ COMPOSITA. *Compound Tincture of Virginia Snakeroot. Sudorific Tincture.*

Preparation.—Take of Virginia Snakeroot, in powder, Ipecacuanha, Saffron, Camphor, and Opium, in powder, of each, *two ounces*; Holland Gin, or Diluted Alcohol *six pints*. Macerate for fourteen days, express, and filter through paper.

The above is the original, and undoubtedly the best form of preparing this tincture, yet many Eclectics are opposed to the Opium, and substitute in its place Ladies Slipper Root *eight ounces*.

Properties and Uses.—This is a powerful sudorific, and is used in all cases where a copious perspiration is required, or where it is desired to lessen pain, allay nervous excitability, procure sleep, and keep up a determination to the skin. One teaspoonful in some warm herb tea, repeated every hour, aided by warm infusions and bathing the feet, will soon produce copious diaphoresis. In pleurisy, a much larger dose may be given. In other cases it may be given in doses of from ten to sixty drops. It will be found beneficial in after-pains, painful dysmenorrhea, amenorrhea from recent exposure to cold, cramp in the stomach, hysteria, in all fevers and inflammatory diseases, etc. The tincture cannot well be made by percolation.

TINCTURA STILLINGIÆ. *Tincture of Queen's Root.*

Preparation.—Take of the recent Queen's Root, cut into small pieces and bruised, *three ounces*; Alcohol *one pint*. Macerate for fourteen days, express, and filter.

Properties and Uses.—This Tincture possesses the virtues of the root, and may be used as a substitute for it in scrofulous, syphilitic, and rheumatic diseases. It is likewise beneficial in laryngeal, bronchial, and all pulmonary affections. The dose is from ten to thirty, or even sixty drops, to be administered in sweetened water. It may likewise be advantageously added to alterative syrups or tinctures.

TINCTURA STRAMONII. *Tincture of Stramonium.*

Preparation.—Take of Stramonium Seed, bruised, *four ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Stramonium Seed, in powder, with Diluted Alcohol, allowing it to stand for forty-eight hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—This preparation may be used for all the purposes for which Stramonium is given. The dose is from ten to forty drops, two or three times a day, gradually increased, if required, until it affects the system.

TINCTURA STRYCHNÆ COMPOSITA. *Compound Tincture of Strychnia.*

Preparation.—Take of Strychnia, in crystals, *sixteen grains*; Distilled Water, Alcohol, of each, *seven fluidounces and a half*; Acetic Acid, Compound Tincture of Cardamom, of each, *half a fluidounce*. Dissolve the Strychnia in the Alcohol and Acetic Acid mixed together, and then add the remaining articles.

Properties and Uses.—This Tincture is useful in impaired spinal energy, or spinal exhaustion, whether the result of excessive study, muscular effort, sexual indulgence, masturbation, etc.; it is likewise efficacious in paralysis, constipation debility of the generative organs, malarious diseases, chronic splenitis, and recent diseases of the prostate gland. It is contra-indicated in irritation of the spinal nerve. Two fluidrachms of the tincture contain one eighth of a grain of strychnia. The dose is from ten to thirty drops, three times a day.

TINCTURA SYMPLOCARPI. *Tincture of Skunk Cabbage.*

Preparation.—Take of Skunk Cabbage Root, in powder, *three ounces*; Diluted Alcohol *one pint*. Macerate for fourteen days, express, and filter.

This Tincture may also be prepared by thoroughly moistening the Skunk Cabbage Root, in powder, with Diluted Alcohol, allowing it to stand for forty-eight hours, then transferring it to a percolator, and gradually pouring upon it Diluted Alcohol until one pint of filtered liquor is obtained.

Properties and Uses.—Tincture of Skunk Cabbage is antispasmodic, and will be found useful in asthma, pertussis, hysteria, and other spasmodic affections; it is also beneficial in irritable, or excitable conditions of the nervous system. The dose is from a fluidrachm to half a fluid-ounce, repeated as often as required.

TINCTURA TOLUTANA. *Tincture of Tolu.*

Preparation.—Take of Balsam of Tolu *three ounces*; Alcohol *two pints*. Macerate until the Balsam is dissolved; then filter through paper.

Properties and Uses.—This Tincture possesses the properties of balsam of Tolu, and may be used in cough, and chronic catarrhal affections; also as an addition to cough and expectorant mixtures. The dose is from half a fluidrachm to one or two fluidrachms.

TINCTURA TOXICODENDRI. *Tincture of Poison Oak.*

Preparation.—Take of fresh Leaves of Poison Oak *four ounces*; Alcohol *three fluidounces*. Macerate for fourteen days, express, and filter under cover.

Properties and Uses.—This Tincture may be used for all the purposes for which the poison oak is given, in the dose of from three to ten drops, in water. It should be kept in vials well stopped, as its active principle becomes dissipated on exposure. It must be used with great care.

TINCTURA VALERIANÆ AMMONIATA. *Ammoniated Tincture of Valerian.*

Preparation.—Take of Valerian, bruised, *four ounces*; Aromatic Spirit of Ammonia *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Valerian, in powder, with Aromatic Spirit of Ammonia, allowing it to stand for twenty-four hours in a covered vessel, then transferring it to a percolator, and gradually pouring upon it Aromatic Spirit of Ammonia until two pints of filtered liquor are obtained.

Properties and Uses.—This is used as an antispasmodic in hysteria, and other nervous affections, in the dose of one or two fluidrachms, given in sweetened water, milk or some mucilaginous fluid.

The AROMATIC SPIRIT OF AMMONIA (*Spiritus Ammoniaë Aromaticus*), is antacid, stimulant, and aromatic; and is used in sick headache, hysteria, flatulent colic, fainting, etc., in doses of from thirty to sixty drops, or more, in sweetened water. It is made as follows: Take of Muriate of Ammonia *five ounces*; Carbonate of Potassa *eight ounces*; Cinnamon, Cloves, of each, bruised, *two drachms*; Lemon Peel *four ounces*; Alcohol, Water, of each, *five pints*. Mix them, and distil off seven pints and a half.—*U. S.*

TINCTURA VIBURNI COMPOSITA. *Compound Tincture of High Cranberry Bark.*

Preparation.—Take of High Cranberry Bark, in powder, *two ounces*; Lobelia Seed, in powder, Skunk Cabbage Seed, bruised, of each, *one ounce*; Stramonium Seed, bruised, Capsicum, Bloodroot, of each, in powder, *half an ounce*; Alcohol, *four pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared from the dry materials, in powder, by thoroughly moistening them with Alcohol, allowing them to stand in a covered vessel for forty-eight hours, then transferring them to a percolator, and gradually pouring upon them Alcohol until four pints of filtered liquor are obtained.

Properties and Uses.—This Tincture is stimulant and antispasmodic, and will be found efficacious in asthma, hysteria, and all nervous and spasmodic diseases. I have effected many cures of asthma (uncomplicated), with this remedy. The dose is from twenty to sixty drops, three times a day; or, during a paroxysm, as often as required.—*J. K.*

TINCTURA XANTHOXYLI. *Tincture of Prickly Ash.*

Preparation.—Take of Prickly Ash Berries *eight ounces*; Diluted Alcohol *two pints*. Macerate for fourteen days, express and filter.

This Tincture may also be prepared by thoroughly moistening the Prickly Ash Berries, in powder, with Alcohol, allowing them to stand for forty-eight hours, then transferring them to a percolator, and gradually pouring upon them Alcohol, until two pints of filtered liquor are obtained.

Properties and Uses.—This Tincture possesses all the virtues of the berries. (*See Prickly Ash Berries, p. 971, Part II.*) In cholera, the dose is from half a fluidounce to a fluidounce, repeated as often as required, in ordinary cases, from one to four fluidrachms, given in water. Probably a tincture of the oil of the berries will effect the same results.

TINCTURA ZINGIBERIS. *Tincture of Ginger.*

Preparation.—Take of Ginger, bruised, *eight ounces*; Alcohol *two pints*. Macerate for fourteen days, express, and filter through paper.

This Tincture may also be prepared by thoroughly moistening the Ginger, in powder, with Alcohol, allowing it to stand for twenty-four hours, then transferring it to a percolator, and gradually pouring upon it Alcohol until two pints of filtered liquor are obtained.—*U. S.*

Good Jamaica Ginger should be used in preparing this Tincture.

Properties and Uses.—Tincture of Ginger is an aromatic carminative, and may be added to tonic, purgative, and aromatic preparations with advantage. It may be used in flatulency, torpor of the digestive organs, and in debilitated conditions of the alimentary canal. The dose is from ten to sixty drops in sweetened water, milk, wine, or mucilage, as the indications will allow. Its chief use is in the preparation of Syrup of Ginger.

TROCHISCI.

Troches.

Troches or *Lozenges* are medicinal substances in powder, destitute of any very disagreeable flavor, which, by means of sugar and mucilage are incorporated into small, dry, solid masses, usually of a circular, flattened shape. As they are designed to be held in the mouth, and dissolved gradually in the saliva, they ought not, as a general rule, to be composed of medicines which act feebly, or require to be given in large quantities. Gum Arabic and Tragacanth are both employed, but the

latter is preferred on account of the greater tenacity of its mucilage. The *Dictionnaire des Drogues* gives the following directions for preparing them: The best gum tragacanth having been selected, it is made into a mucilage with cold water, and strained; the sugar having been mixed with the other powdered ingredients, is thoroughly incorporated with the mucilage, by rubbing upon a marble slab, and is formed into a paste. This paste is then rolled out on the slab, its adhesion to the roller being prevented by powdering over it from time to time, a mixture of sugar and starch; and uniformity of thickness is effected by a frame of wood or iron, upon which the ends of the roller are placed. The extended layer of paste is again covered with the mixture of sugar and starch, and the troches cut by means of a tin-plate punch, which gives them the required shape and size. After exposure to the air for twelve hours, on paper, the troches are placed on a sieve to dry in a drying room or closet, and the superfluous powder remaining on them is removed by means of the sieve.

Lozenges are frequently composed of extract of liquorice and gum Arabic with sugar, which renders them quite tough, so as to become unmanageable by long standing. In such cases the best mode is to thoroughly mix the articles together, and then add the sugar, in the form of a dense syrup, made with but two-thirds of the usual quantity of water required for simple syrup, mix it quickly, and while yet warm, roll the mass into long cylinders, and when nearly dry, cut them of the required size.

TROCHISCI ACIDI CITRICI. *Troches of Citric Acid.*

Preparation.—Take of Citric Acid *a drachm*; Refined Sugar *eight ounces*; Oil of Lemons *twelve minims*; Mucilage of Tragacanth, *a sufficient quantity*. Pulverize the Sugar and Acid, add the Oil, mix them thoroughly and with the Mucilage beat them into a proper mass for making Lozenges of twelve grains each.

Properties and Uses.—This is an agreeable refrigerant and demulcent, and may be used in fevers, colds, influenza, and as a pleasant mode of taking citric acid; they must not be used too freely, as the stomach will thereby become deranged.

TROCHISCI ACIDI TARTARICI. *Troches of Tartaric Acid.*

Preparation.—Take of Tartaric Acid *a drachm*; Refined Sugar *four ounces*; Oil of Lemons *ten minims*; Mucilage of Tragacanth *a sufficient quantity*. Pulverize the Sugar and Acid, add the Oil, mix them thoroughly, and with the Mucilage beat them into a proper mass for making Lozenges of ten grains each.

Properties and Uses.—These lozenges are useful as a refrigerant and demulcent in colds, fevers, etc. Like the preceding preparation, the stomach will become deranged by too freely using them.

TROCHISCI CAPSICI. *Troches of Capsicum.*

Preparation.—Take of Capsicum, in powder, *half an ounce*; Sugar *six ounces*; Mucilage of Gum Tragacanth *a sufficient quantity*. Mix the Sugar and Capsicum thoroughly together, and with the Mucilage beat them into a proper mass for making two hundred and forty lozenges.

Properties and Uses.—These troches will be found useful in dryness and irritation of the throat, relaxed uvula, and in all cases where capsicum is indicated. Each troche contains one grain of capsicum.

TROCHISCI CAPSICI ET LOBELIÆ. *Troches of Capsicum and Lobelia.*

Preparation.—Take of Capsicum, in powder, *half an ounce*; Oil of Lobelia *twenty-four minims*; Sugar *six ounces*; Mucilage of Tragacanth *a sufficient quantity*. Mix the Sugar and Capsicum thoroughly together, add the Oil, and with the Mucilage beat them into a proper mass for making two hundred and forty lozenges.

Properties and Uses.—These troches are stimulant and expectorant, and may be employed wherever such a combination is desired. Each troche contains one grain of capsicum, and one-tenth of a minim of oil of lobelia.

TROCHISCI CROTONIS. *Troches of Croton Oil.*

Preparation.—Take of Croton Oil *five minims*; Starch *one scruple*; Sugar *one drachm*; Chocolate *two drachms*. Mix the Oil with the solid ingredients in powder, and add a sufficient quantity of Water to form a mass of proper consistence, for thirty lozenges.

Properties and Uses.—These lozenges are cathartic; each lozenge contains one-sixth of a minim of croton oil.

TROCHISCI DIOSCOREINI. *Troches of Dioscorein.*

Preparation.—Take of Dioscorein *one ounce*; Ginger *half an ounce*; Oil of Peppermint *twenty-four minims*; Sugar *six ounces*; Mucilage of Tragacanth *a sufficient quantity*. Mix the Sugar, Dioscorein and Ginger thoroughly together, add the Oil, and with the Mucilage beat them into a proper mass for making two hundred and forty lozenges.

Properties and Uses.—These troches are useful in cases of colic, flatulency, borborygmi, and to cure as well as prevent a return of bilious colic. Each troche contains two grains of dioscorein.—*J. K.*

TROCHISCI GLYCYRRHIZÆ ET OPII. *Troches of Liquorice and Opium.*
Wistar's Cough Lozenges.

Preparation.—Take of Opium, in powder, *half an ounce*; Extract of Liquorice, Sugar, Gum Arabic, of each, in powder, *ten ounces*; Oil of Anise *a fluidrachm*. Mix the powders intimately, add the Oil, and with Water form them into a mass, to be divided into troches weighing each six grains.—*U. S.* (*See remarks on Troches, p. 1274.*)

Properties and Uses.—These lozenges are demulcent and anodyne, and will be found useful in allaying cough, in cases where opium is admissible. Each lozenge contains about one-tenth of a grain of opium.

TROCHISCI GLYCYRRHIZÆ COMPOSITA. *Compound Troches of Liquorice.*

Preparation.—Take of Muriate of Ammonia, in powder, *one drachm and a half*; Muriate of Morphia *six grains*; Gum Arabic, Sugar, Extract of Liquorice, of each, in powder, *seven drachms*; Oil of Sassafras *thirty minims*; Oil of Stillingia *twenty minims*; Tincture of Balsam of Tolu *three fluidrachms*. Mix the powders thoroughly together, then add the Oils and Tincture, and with Water form them into a mass, to be divided into one hundred and eighty troches.

Properties and Uses.—These troches are very valuable in cough, irritation or tickling of the throat, laryngitis, and bronchitis. Each troche contains the one-twentieth of a grain of morphia.—*J. K.*

TROCHISCI IPECACUANHÆ. *Troches of Ipecacuanha.*

Preparation.—Take of Ipecacuanha, in powder, *half an ounce*; Sugar, in powder, *fourteen ounces*; Arrow Root, in powder, *four ounces*; Mucilage of Tragacanth *a sufficient quantity*. Mix the powders intimately, and with the Mucilage form them into a mass, to be divided into troches of ten grains each.—*U. S.*

Properties and Uses.—These troches are expectorant, and will be found useful in catarrhal complaints. Each troche contains about a quarter of a grain of ipecacuanha.

TROCHISCI MAGNESIÆ. *Troches of Magnesia.*

Preparation.—Take of Magnesia *four ounces*; Sugar *a pound*; Nutmeg, in powder, *a drachm*; Mucilage of Tragacanth *a sufficient quantity*. Rub the Magnesia, Sugar, and Nutmeg together until they are thoroughly mixed; then with the Mucilage form them into a mass, to be divided into troches each weighing ten grains.—*U. S.*

Properties and Uses.—These are antacid and laxative, and may be used in cases of acidity of stomach, especially when attended by costiveness.

TROCHISCI MENTHÆ PIPERITÆ. *Troches of Peppermint.*

Preparation.—Take of Oil of Peppermint *a fluidrachm*; Sugar, in powder, *a pound*; Mucilage of Tragacanth *a sufficient quantity*. Rub the Oil with the Sugar until they are thoroughly mixed; then with the Mucilage form them into a mass, to be divided into troches each weighing ten grains.—*U. S.*

Properties and Uses.—These are carminative and antispasmodic, and will be found useful in nausea, flatulence, griping from purgative medicines, and slight gastric or intestinal pains. If eaten too freely they cause derangement of the stomach.

TROCHISCI PODOPHYLLINI. *Troches of Podophyllin.*

Preparation.—Take of Podophyllin *one scruple*; Leptandrin *four scruples*; Oil of Sassafras *a fluidrachm*; Sugar *six ounces*; Mucilage of Tragacanth *a sufficient quantity*. Rub the Sugar, Podophyllin, and Leptandrin together until they are thoroughly mixed, then add the Oil, and with the Mucilage beat them into a proper mass for four hundred and eighty lozenges.

Properties and Uses.—Cholagogue, alterative, and purgative. Patients laboring under constipation, hepatic torpor, dysentery, or other diseases in which the above combination is desired or indicated, may use several of these troches a day, according to the effects which they produce. Each troche contains one-twenty-fourth of a grain of podophyllin, and one-fifth of a grain of leptandrin; in ordinary cases, twelve troches used per day, will maintain regularity of the bowels. If it be desired to have these lozenges more active, two or three scruples of podophyllin may be added for the same number.

TROCHISCI RHEI ET POTASSÆ. *Troches of Rhubarb and Potassa.*

Preparation.—Take of Rhubarb, in powder, *two ounces*; Bicarbonate of Potassa *one ounce*; Oil of Peppermint *a fluidrachm*; Sugar *twelve ounces*; Mucilage of Tragacanth *a sufficient quantity*. Rub the Rhubarb, Sugar, and Potassa thoroughly together, then add the Oil, and with the Mucilage beat them into a proper mass for five hundred lozenges.

Properties and Uses.—These troches may be used by persons subject to, or laboring under diarrhea, dysentery, cholera-morbus, acidity of stomach, heartburn, etc. They will also prove tonic in small quantity. From six to twelve may be used daily. Each troche contains nearly two grains of rhubarb.

TROCHISCI SODÆ BICARBONATIS. *Troches of Bicarbonate of Soda.*

Preparation.—Take of Bicarbonate of Soda *four ounces*; Sugar, in powder, *a pound*; Mucilage of Tragacanth *a sufficient quantity*. Rub the Bicarbonate of Soda with the Sugar until they are thoroughly mixed; then with the Mucilage form them into a mass, to be divided into troches, each weighing ten grains.—*U. S.*

Properties and Uses.—These are antacid and antilithic, and will be found useful in uric acid gravel, heartburn, and acidity of stomach.

TROCHISCI STILLINGIÆ COMPOSITA. *Compound Troches of Stillingia.*

Preparation.—Take of Oil of Stillingia *one fluidrachm*; Oil of Prickly Ash Berries, Oil of Sassafras, of each, *four fluidrachms*; Sugar *ten ounces*; Mucilage of Gum Tragacanth *a sufficient quantity*. Rub the Oils with the Sugar until they are thoroughly mixed; then with the Mucilage form them into a mass to be divided into four hundred and eighty lozenges.

ROAD
CASTLE

1.30 till 10.

Surprise.
DUP.
Acrobatic.
Horseman.
Etc. Etc.
Comic Subjects

TRA.
Popular Prices.

NEMA.

10 TO 10 P.M.

PLAYTHING.

Artist.
Longstaff.
National 2-Part.
Comedy.

EMPIRE

—8.40.

as Variety.
Location.

ICE ALLEN.

2 STEPPERS.
Gatehead.

EMPIRE

—8.40.

Three Jests.
Tard, Joe de
Telephone 1316.

ABBROUCH.

—8.30.

GHTON.

in Selections.
N & CORNELL.

FRASER.
Idlebrough.

G.
Apollo Theatre.

EMPIRE

—8.40.

3. Roofs Rags.
3. Canadians 3.

STOCKTON

—8.45.

Important.
Production.
Belles, J. W.

AUCKLAND

day at 7.
ent.

REHARRAL.

ent.
ent.

ABINGTON.

—8.45.

Play, entitled
TECTIVE."

ARLINGTON.

—8.45.

Harlie Harvey in
Tence.

UDE EDWARDS

ARLINGTON.

AW

Y LIFE."

ED HIMSELF in
GERMANY."

S WITH THE
PRISONERS.

ADE CINEMA.

LINGTON.

6.30 to 10.30.
6.15.

Cinema at 2.30.

FILE.

DARLINGTON

6.30 to 10.30.
at 2.30.

ERS."

Seats may be
Company.

HOUSE.

INGTON.
6.30 to 10.30.
at 2.30.

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France W. Gerard's
GERMANY."

MBRELANDS."
Soldiers admitted

DON STREET.

N. 6.15 to 10.
no intense drama.

THE FATAL
CIRCUS."

(Saturday, 2.30.
4.30.)

MARKET PLACE.

4.30. Real Hepworth
and's novel, "THE
THE BURNING
STREET."

ICES.

CRICKET

GE.
3rd.

SHIRE XI.

N'S XI.
the following—
F. W. Frank, F.
and C. S. Wilson,
Mr. Kilner, and

6.15.
T. (Rupon)

REFERENCES.

ATTEST.

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IVEN that the
Company for the
CLOSED from the
inclusive.

TING. Secretary.
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7. 24th.
and Sec. 34.
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FIFTY OF

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EWCASTLE.

24th, 1918
and place will
be taken 2.30 p.m.
Pence Card only.

Births, Marriages, Deaths, Thanks,
and In Memoriam Notices, 16
words Two Shillings, and 6d. for
every additional 9 or part of 9
words.

BIRTH.

LITAS—On 21st July, 1918, to Mr. and Mrs.
R. J. Lyss, of Station-road, Middleton-St.
George, a son.

MARRIAGE.

BROUGHTON—WILSON—On the 23rd July, at
St. Paul's, Spennymoor, by the Rev. G. R. R.
Cook, vicar, Lieutenant R. B. Broughton, R.E.,
only son of Mr. and Mrs. J. Broughton, Leaden-
road, Darlington, to Grace Gregory Wilson,
daughter of Mr. and Mrs. R. J. Wilson,
Wason, Spennymoor.

DEATHS.

CARBERT—On July 25th, at 14, Blackett-street,
Mary, the beloved wife of the late John
Carbert, interment at Auckland Cemetery, on
Monday, the 26th, coffin leaving residence at
2.30 p.m. Friends kindly accept this (the only)
intimation.

GIRLING—On July 24th, at High Hope-street,
Cock, Audrey, aged 18 years, the beloved
daughter of Rufus and Anne Girling, inter-
ment at Auckland Cemetery, on Saturday, July
27th, Coffin to leave residence at 2.30. All
friends kindly invited.

LONGSTAFF—On the 24th inst., aged 39 years,
Elizabeth, dearly-beloved wife of Thomas R. C.
Longstaff, saddler, interment at Willington
Cemetery on Saturday, Coffin to leave resi-
dence, 17, Low Willington, at 2.30 p.m. Friends
please accept this (the only) intimation.

SCOTT—On July 24th, at Leazes View, West
End, Willington, George, William, dearly-
beloved husband of Jane Scott, formerly of Tow
Law, interred at Willington Churchyard on
Saturday, July 27th, Coffin to leave resi-
dence at 2.30 p.m. Friends please accept this
intimation.

WILSON—At Seales Farm, Richmond, on 24th
inst., E. A. Wilson, widow of the late William
Wilson, aged 76 years. Interred at Gilling
1 p.m. Saturday, 27th. Friends please accept
this (the only) intimation.

ROLL OF HONOUR: IN MEMORIAM.

SCOTT—In loving memory of Lance-Corpl. Fred
Scott, Yorkshire Regiment, aged 34 years,
killed in action July 20th, 1917, dearly-beloved
brother of Mr. and Mrs. J. Scott, 61, Landwyne,
Darlington; also brother Tom (in
France), sisters, and brother-in-law Fred (in
France). Still to memory dear.

SIXTH—In loving memory of Sergeant Staff.
Sgt. Frank Horace Smith, Army Ordnance
Corps, 4, Northcote-terrace, Darlington, killed
in action July 20th, 1916. Ever remembered by
his sister and brother-in-law. Death divides
but memory unites.

WINTER—In ever loving remembrance of Lance-
Corpl. Joseph Winter, who died from gas
poisoning in France July 20th, 1917, dearly-
beloved son of John and Margaret Winter,
Moorat, Stewart-street, Darlington. Lovingly
remembered by father, mother, brothers and
sister, and all who knew him. Fold him,
Heavenly Father, in Thy arms. Thus may he
ever be a link of love between our human
hearts and Thine.

MR. LAYLAND AND DAUGHTERS, 74,
Westminster-street, Darlington, wish to
THANK all friends and neighbours for their
kindness and sympathy in their sad bereavement,
and for floral tributes.

TOM HORSFALL, Certified Embalmer. Terms
moderate. Tel. 213 Darlington.

WEDDING RINGS—Present with each—
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removals. Cabs & Landaus for hire. Tel. 2647.

MISS JORDAN, DRESSMAKER and
COSTUMIER, 6, HIGH TERRACE, HIGH
NORTHGATE, DARLINGTON. Terms moderate.

TO-DAY'S REFLECTION.

How strange a thing is what men call
pleasure. Plato.

The Northern Echo

TELEGRAMS: "ECHO," DARLINGTON.
TELEPHONE: No. 2670.

FRIDAY, 26 JULY, 1918.

THE OUTLOOK.

REAL IMPERIAL EXPANSION.

When some people talk about a self-
supporting Empire they seem to forget
that all Empires are self-supporting.
If they have not the means of producing
some things they desire, they produce
more of the articles they can easiest
make available, and exchange them for
what they want. It is national
economy to do so. Thus we may send
coal to France because it is easier and
cheaper to do that than to produce silk
and wines, for instance, which are sent
to us in return. We could at least
grow the grapes out of which the wines
are made. But we should have to
cover miles of country with green-
houses, whereas in France the vines
flourish in the open ground. Necess-
sarily the wines would prove more ex-
pensive than the French wines, and
similarly home-produced silk would
cost more than across the Channel.
Hence it pays the country as a whole to
exchange the goods we can produce
most cheaply in excess of our own re-
quirements for the articles which others
can spare and which we want. But if
we are only concerned to ensure profits
to individuals interested in silk or wine
production we can put such a tax upon
imported silk and wine as would raise
the price sufficiently to induce firms to
produce them at home.

But the merits of Free Trade or Pro-
tection do not need to enter into the
question of developing unused re-
sources. We remember when the slag
of the Cleveland furnaces was sent out
to sea. To-day it yields a revenue as
maize and has come far to realise Mr.
Prothero's desire to make two blades of
grass grow where only one could grow
before. The old-fashioned coke oven
gave us only coke. The new one gives
us by-products valued at many times
the price of the coke, which is still
yielded. There are scores of similar
illustrations which might be quoted to
show that research, invention and enter-
prise suffice to enable us to tap un-
known sources of wealth. And there
are still many resources awaiting
development. Our moorlands and
bare hill sides, yielding nothing of real
value to the community, could be
clothed with forests. We can find
uses for all the wood we can import as
well as for that which we ourselves
might grow.

Necessity, unfortunately, is compel-
ling us to think of turning our atten-
tion to these matters. They are such
as demand consideration by the Govern-
ment. Schemes of afforestation and
reclamation of waste lands demand
national backing, and they would be
profitable in the sense that they would
add to the world's total of developed
resources. At any rate they are more
the business of national authorities
than is the tinkering with tariffs
designed to benefit any one interest at
the expense of the community.

We, for instance, are interested in
paper, the raw material for which is
growing scarcer. The Imperial In-
stitute has discovered that several
grasses in tropical and sub-tropical
lands make excellent paper. Canada
has experienced a shortage in pine oil.
Its laboratories, after experiment, find
the pine stumps (a greater nuisance
than our slag-heaps were) a neglected
source of supply. Better still, the
wasted wood alcohol from wood distilla-
tion industries, has been made to
yield an even cheaper oil. There are
mountains of shale in Colorado capable
of yielding oil, naphtha, paraffin, am-
monia and other by-products to a
greater extent than has ever yet been
produced in America. The demand for
more land under corn has given us new
and speedy methods of clearing the
miles of stump-land. We could
multiply these illustrations many fold.
But they suffice to show how limitless
is the scope for inventiveness and enter-
prise—qualities of far more value to
any Empire than expedients for merely
redistributing—at great cost and sacri-
fice—the existing industries of the
world.

ON AN AMERICAN
TRAIT.

By ALPHA OF THE PLOU

At the luncheon to Mr. Hoover at
Mansion House on Tuesday I met
an American officer, whose conver-
sation I enjoyed very much and with
disregard very heartily. We had
much before but we quarrelled like
friends, gaily, good-humouredly,
fiercely. When I asked him at the
low it came about that strangers
were, we could be so antagonistic
to cordial, he replied: "Not stran-
gely; we're rats of the same piece
was a remark that did me good,
but I do not think it entirely
what I may call the accessibility
American. The common long
course, a great hole, and the
traditions also. You are rare
at home with a man who thinks
language than your own. The
Rue de la Grande misère
humanity."

But it is not those things which
the American so approachably
so easy to get on terms with, as
familiar as it were. I am not
going to say nice things about
him, I fully admit that, taken
I like him. Taken in de-
into his hundred million
say he would be found to
defects as the average of
one quality he has above all
it is the quality of immen-
intercourse. There is no
before you get at him
baffling atmosphere of
tense to get through, and
to find out on what you
to stand. You are
rather he is on you,
the open, without need
talks right ahead with
case of a man who is
end at home with you
from intellectual ori-
cloudiness. He is jus-
ing to a plain man.

It is the manner
of a democratic age
of the State is plain
may be the ruler of
and may go back
private citizen re-
trained by the tr
Douglass, the new
coin. "He tries
Douglass after h
"He did not let
there was any
our skins." It
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And as if
abomination,
Fat system
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of sham jaw
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shall still be
fine freedom,
which is thei

"ECHO"

SOLDIER'S FAY
dependence you
there should b
through age o
made.

SOLDIER'S WIF
will get 19s 9d.
age. Position is
a gratuity of £1
Mrs. JORDISON—
A SOLDIER'S WIF
husband's pre-w
answer the ques

SEPARATION

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up to a maximum of 10s.
Mrs. MALPAS—An allow-
respect of both husband's
now married you have
the rag paper.
Mrs. E. S. (Darlington C)
collected at a special rat
fore the new Pay Warrant
him, in any case separat
standing.

ANXIOUS ONE (Darlington),
master for the allowance
He will take the necessary
B. C. (Houghton-le-Spring)
obliged for your letter.
Mrs. J. B.—You have been m
a man is involved from the
allowance is continued for th
charge.

Mrs. B.—The Local War Pensions
be able to grant an allowance
to her support up to date of

MILITARY.

PERPLEXED.—(1) You see it's m
against his books. The only
it is to ask for a detailed list
accounts. (2) If pension is less
Local War Pensions Committee
an examination by the medical
discharge is not final unless p
overseas. (3) Badge is given w
charged.

FUZILLED READER (Stockton)—
be so necessary. But say ma
military age who was graded bel
is still in civil life, one if he
his grade card applied to confi
new instructions on application
Service area office.

W. W.—You are practically in th
time as a discharged man, and u
as an A.R.M.W. you are quite
employment is occupied.

ELECTRIC (Grange-overlook)—If you
lower than Grade III, it will be fin
Mrs. T. V. F.—Application would be
so long as he is overseas.

W. G. (Fenborough)—Discharge seen
with provisions of Military Service
with respect to men who have serv
take no steps for the present, and w
inquiries.

J. P.—Writing you privately.

MISCELLANEOUS.

F. J. C. (Middletown)—You must app
permit to the Assistant-Director of
Service for the area.
T. W. (West Auckland)—Certainly, th
is part of your income.

H. B. (Blackhall Colliery)—Your son
to pay the tax.
CITIZEN (South Bank)—If your empl
reside on the premises you are only
you occupy a room or rooms let un
the claim is good. However, if you
the list it is now too late to make a
this register.

Address your letters to "The
Northern Echo," Office, Priestsgate,
Don, or letters may be handed in to
the office at Warrington-road, Newcastle; Kin
Newcastle; 11, White-street, West Ham
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2 doz.	100	4	17 6
2 doz.	100	4	17 6
2 doz.	100	17	10 0
2 doz.	100	6	17 6
2 doz.	100	27	10 0
2 doz.	100	8	15 0
2 doz.	100	22	10 0
2 doz.	100	10	10 0
2 doz.	100	18	15 0
2 doz.	100	12	17 6
2 doz.	100	28	10 0
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2 doz.	100	30	0 0
2 doz.	100	30	0 0
2 doz.	100	From	19 10 0
2 doz.	100	15	10 0
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The enormous increase in the prices of raw materials scarcity makes this your last opportunity to secure Furniture, and Soft Furnishings at below market cost prices.

SPECIAL.

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- Seamless Axminster Carpets, all reduced, on view
- Sideboards, three Bedroom Suites, three Chests, cost price.
- 20 doz. Towels, 1/1 1/2
- 40 doz. Towels, 1/4
- 50 pairs White Twill Sheets, 2 1/2 x 3, 23/6
- 30 doz. Horrockses' Pillow Cases, 1/11
- 45 pairs Flannelette Blankets, full size, 22/6
- Special line in Saten Down Quilts, 65/-
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- A bale of Travellers' Samples Cretoms,

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INVITE CUSTOMERS TO INSPECT THE FIRST-CLASS FURNITURE

- Sideboard Bed (full size), Bevelled Plate Mirror and Carved Pillars, &c.
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- Light Bedroom Suite. Splendid Bargain
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- Oak, Satin Walnut, Dark Walnut Leather 7 pieces
- Green Plush Suites
- Chesterfields, Dining- and Drawing-Room
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Before absolutely deciding to purchase else call, and you are sure to be satisfied. SO SO by Purchasing at

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HOUSE FURNISHER

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Pleasure
is milder,
otherwise
the same
as Barney's.

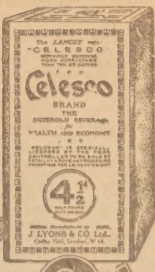


Men who take to the Pipe late on in life find gives an easy start. Old stagers with the Pipe men who prefer a good Virginia any day to that ever came out of Vuelta Abajo.

Mild, yet satisfying. Later, the natural course is Pleasure on to Barney's, its medium Cousin. But have Punchbowl with its full flavour.

Whilst many Tobaccos are different to what they were, you have these three unchanged givers-of-pipe-joy to choose from.

All are Pre-V super now, from most T of John Sinc



Try the New Household Beverage

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Absolutely the CHEAPEST — also CELESCO costs about a quarter the price of tea of nutriment and perfectly digestible. Refreshing Sustaining! CELESCO is Food and Drink

The "Lancet" "Certainly contains more nutritives than and can be taken by those whose diet will not permit of their taking other be says:

You really MUST try it! 4 1/2 D. per half full ne

Sold at all Grocers, Chemists & Stores. If unobtainable, write to J. LYONS & CO., Ltd. Celesco Dept. Cadby Hall, London, W.14

Properties and Uses.—These troches form a very agreeable remedy for rheumatic, syphilitic, scrofulous, bronchial, and laryngeal affections, and may be used somewhat freely by patients thus afflicted. Eight lozenges contain one minim of oil of stillingia, and the quantity used per day must be regulated according to their influence on the stomach and bowels. They will likewise be found beneficial in chronic affections of the mucous membranes.—*J. K.*

TROCHISCI ZINGIBERIS. *Troches of Ginger.*

Preparation.—Take of Good Jamaica Ginger, in powder, *one ounce*; Sugar *seven ounces*; Mucilage of Tragacanth *a sufficient quantity*. Mix the Sugar and Ginger thoroughly together; then with the Mucilage form them into a mass to be divided into lozenges of fifteen grains each.

Properties and Uses.—These form a grateful cordial stimulant, and may be used in cases of flatulence, debility of the stomach, etc.

UNGUENTA.

Ointments.

Ointments are Fatty Substances, containing the properties of certain medicines, and are designed for external use; they are softer than cerates, being of a consistence resembling that of lard or butter, which renders them of easy application to the skin, by inunction. They are most commonly prepared with lard, which should be entirely free from salt and rancidity. Lard may be prepared for this purpose, by melting it in twice its quantity of Boiling Water, stirring the mixture constantly; then setting it aside to cool, and separating the Lard when it has solidified. This forms Prepared Lard, (*Adeps Suillus Præparatus*). Substances entering into the formation of Ointments, and which are not soluble in the fatty matter, should be very finely powdered previous to incorporation with it; or if they are soluble in alcohol or water, they may frequently be advantageously triturated and softened with a small quantity of one of these solvents, as with hard extracts, etc. When Ointments are long kept they are very apt to become rancid, hence, it is usually preferable to prepare them in small quantities at a time, or only when required for use. Either Benzoic Acid, or Poplar Buds, if not objectionable, or incompatible with the Ointment, will, when added to it, prevent, in a great degree the tendency to rancidity. Ten drops of the Spirit of Nitric Ether, incorporated with an ounce of Ointment, will remove the disagreeable, fatty odor of these preparations. According to Dr. C. W. Wright, Fats and Fixed Oils may be preserved free from rancidity and disagreeable odor for a long time, by melting them with powdered Slippery Elm, in the proportion of one drachm of the Bark to a pound of the Fat; after ten or fifteen minutes' application of heat, the Fat must be strained off. The Elm Bark communicates an odor to the Fat, that is scarcely distinguishable from that of the kernel of the hickory-nut.

UNGUENTUM ACIDI MURIATICI. *Ointment of Muriatic Acid.*

Preparation.—Take of Muriatic Acid *one fluidrachm*; Spermaceti Ointment *one ounce*. Mix together in a glass or porcelain mortar.

Properties and Uses.—This ointment is used in scald-head, to be applied night and morning, after the scabs have been removed by a poultice.

UNGUENTUM ACIDI NITRICI. *Ointment of Nitric Acid.*

Preparation.—Take of Olive Oil *one pound*; Prepared Lard *four ounces*; Nitric Acid *five and a half fluidrachms*. Melt the Oil and Lard together in a glass vessel, and when they begin to congeal, add the acid, stirring the mixture constantly with a glass rod until it stiffens.

Properties and Uses.—This ointment is used in syphilitic ulcers, eruptive affections, and fistula in ano.

UNGUENTUM ACIDI SULPHURICI. *Ointment of Sulphuric Acid.*

Preparation.—Take of Sulphuric Acid *one fluidrachm*; Prepared Lard *one ounce*. Mix together in a glass or porcelain mortar.

Properties and Uses.—Used in ringworm, itch, and other cutaneous diseases, also in rheumatism and neuralgia.

UNGUENTUM ACIDI TANNICI. *Ointment of Tannic Acid.*

Preparation.—Take of Tannic Acid *two drachms*; Lard *two ounces*. Triturate them well together.

Properties and Uses.—Astringent and antiseptic. Useful in piles, ulcers, some forms of cutaneous disease, and where such indications are required.

UNGUENTUM ACONITI. *Ointment of Aconite.*

Preparation.—Take of Alcoholic Extract of Aconite *one drachm*; Lard *two drachms*. Soften the Extract with a small quantity of Alcohol, if necessary, and mix with the Lard.

Properties and Uses.—This ointment is used in violent neuralgic and rheumatic pains.

UNGUENTUM ALKALINUM. *Alkaline Ointment.*

Preparation.—Take of Carbonate of Soda *two drachms*; Tincture of Opium *one drachm*; Lard *one drachm*. Rub together in a porcelain or wedgewood mortar.

Properties and Uses.—This is used in several forms of cutaneous disease, as lichen, lepra, psoriasis, ichthyosis, porrigo favosa, etc.

UNGUENTUM ALKALINUM CAMPHORATUM. *Camphorated Alkaline Ointment.*

Preparation.—Take of Carbonate of Potassa *one scruple*; Camphor *six grains*; Lard *seven drachms*. Rub together in a mortar.

Properties and Uses.—This ointment is used in sycosis, and several forms of cutaneous disease.

UNGUENTUM AMMONIACALE. *Ammoniacal Ointment. Pommade de Gondret.*

Preparation.—Take of Lard *six drachms*; Suet *four drachms*; Almond Oil *two drachms*; Stronger Solution of Ammonia *twelve fluidrachms*. Melt the Lard, Suet, and Oil together, then add the Ammonia, and shake the whole together in a close bottle.

Properties and Uses.—This preparation is rubefacient, and vesicant; to procure its vesicating influence, it must be covered with a compress after inunction.

UNGUENTUM AQUÆ ROSÆ. *Ointment of Rose Water. Cold Cream.*

Preparation.—Take of Spermaceti *ten drachms*; Glycerin *four fluidrachms*; Oil of Almonds *two fluidounces*; White Wax *a drachm*; Oil of Roses *three drops*. Melt together, by means of a water bath, the Spermaceti, Oil of Almonds, and Wax; then add the Glycerin, in which the Oil of Roses has been placed, and stir constantly until cold.

Properties and Uses.—This is a delightful cooling ointment much employed as an application to irritated, chapped, and abraded surfaces, as chapped lips, hands, etc. It was formerly made of Rose Water *a fluidounce*; Oil of Almonds *two fluidounces*; Spermaceti *half an ounce*; White Wax *a drachm*. But on account of its liability to rancidity, and the separation of the water on exposure, the above formula of Mr. Joseph Laidley is preferred.

UNGUENTUM BAPTISLÆ. *Ointment of Wild Indigo.*

Preparation.—Take of Wild Indigo Root *twenty pounds*; Fresh Butter *ten pounds*; Beeswax *three pounds*; Tallow *one pound and a half*; Diluted Alcohol *a sufficient quantity*. Macerate the Root, in powder, in Diluted Alcohol for forty-eight hours; then transfer it to a percolator, and gradually pour upon it Diluted Alcohol until the liquid passes nearly tasteless. Add the filtered liquor to the other ingredients, and carefully digest with heat, until the Alcohol and Water have evaporated; then strain the mixture.

Properties and Uses.—This ointment is cleansing, detergent, discutient, antiseptic, etc. It is useful in many cutaneous affections, erysipelas, scrofulous, gangrenous, and all other forms of ulcer, piles, etc.

UNGUENTUM BELLADONNÆ. *Ointment of Belladonna.*

Preparation.—Take of Extract of Belladonna *two drachms*; Lard, or Simple Cerate *one ounce*. Mix them.

Properties and Uses.—This forms an anodyne application, and may be advantageously applied in local neuralgia, to painful joints, to dilate the pupil, and also the os uteri, and to the denuded spine in violent tetanus, delirium tremens, and puerperal convulsions.

The *Unguentum Atropiæ*, for similar purposes, is made by triturating Atropia, *five grains*, with Lard, *three drachms*. It must be used with caution, and not be applied on abraded surfaces.

UNGUENTUM BENZOINI. *Ointment of Benzoin.*

Preparation.—Take of Benzoin, in coarse powder, *one ounce*; Fresh Lard *twenty-five ounces*. Heat together for two or three hours in a water bath, and then strain.

Properties and Uses.—This forms an excellent basis for ointments, as benzoin resists rancidity, and the decomposition of metallic salts and oxides. Poplar buds have the same effect.

UNGUENTUM CANTHARIDIS. *Ointment of Spanish Flies.*

Preparation.—Take of Spanish Flies, in powder, *two ounces*; Distilled Water *half a pint*; Resin Cerate *eight ounces*. Add the Flies to the Water, boil down to one half, and strain; then mix the Cerate with the strained liquor, and evaporate to the proper consistence.—*U. S.*

Properties and Uses.—This is intended as a dressing for blisters, to keep up the discharge from them, and not to produce vesication. It is rarely employed by Eclectics.

UNGUENTUM CERÆ ALBÆ. *Ointment of White Wax.*

Preparation.—Take of White Wax *a pound*; Lard *four pounds*. Melt together and strain.

Properties and Uses.—Emollient and protective; also serves as a basis for forming other ointments.

UNGUENTUM CETACEI. *Spermaceti Ointment.*

Preparation.—Take of Spermaceti *six drachms*; White Wax *two drachms*; Olive Oil *three fluidounces*. Melt the articles together over a slow fire, and stir them constantly until cold.

Properties and Uses.—This is a mild emollient ointment, employed as a dressing for blisters, wounds, and excoriated surfaces. As it is apt to become rancid by keeping, it should be made in small quantities at a time.

UNGUENTUM COCCULI. *Ointment of Cocculus Indicus.*

Preparation.—Take of the kernels of Cocculus Indicus *two ounces*; Lard *ten ounces*. Beat the kernels well in a mortar, first alone, and then with a little of the Lard; and then gradually add the rest of the Lard.

Properties and Uses.—This ointment is employed for the destruction of vermin, and in the cure of scabies, and ringworm of the scalp.

UNGUENTUM CONII. *Ointment of Poison Hemlock.*

Preparation.—Take of fresh Hemlock Leaves, Lard, of each, *one pound*; Wax *two ounces*; Spirits *one pint*. Slowly simmer together, until the leaves become crisp, and then express through linen.

Properties and Uses.—This is a mild anodyne. Useful as an application to irritable piles, painful glandular swellings, schirrous tumors, cancerous and other painful ulcers.

The addition of *one drachm* of the Extract to *one ounce* of Lard, makes

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a more efficient preparation, as the heat employed in the preparation of the first formula, probably, impairs the virtue of the hemlock.

UNGUENTUM CREASOTI. *Ointment of Creosote.*

Preparation.—Take of Creosote *half a fluidrachm*; Lard *one ounce*. Mix them.—*U. S.*

Properties and Uses.—This ointment is used in some cutaneous diseases, porrigo of the scalp, and as an antiseptic and stimulant to indolent or gangrenous ulcers.

UNGUENTUM CUCUMIS. *Ointment of Cucumber.*

Preparation.—Take of Green Cucumbers (suitable for table use), *seven pounds*; Pure White Lard *twenty-four ounces*; Selected Veal Suet, cut in pieces, *fifteen ounces*. The unpared Cucumbers, after being washed, are to be reduced to a pulp by grating, and the Juice expressed and strained. The Suet is to be heated over a salt-water bath, until the fat is fused out from the membranes; then add the Lard, and when liquefied strain the mixture through muslin into a wide-mouthed earthen vessel capable of holding a gallon, and stir it until it commences to thicken, when one third of the Cucumber Juice is to be added and beaten with the ointment, by means of a wooden spatula, until its odor has been almost wholly extracted, and which will require several hours. Then allow it to stand until the fluid separates, which must be removed by decantation, and add another third of the Juice. This must be beaten in like manner until exhausted, then decanted, and finally the last third added, and similarly treated. The jar is then to be closely covered and placed in a water-bath, where it must remain an hour, or until the fatty matter entirely separates from the exhausted juice. The green albuminous coagulum which floats upon the surface is then to be skimmed off, and the jar put aside in a cool place that the ointment may solidify. The crude ointment is then to be carefully separated from the watery liquid on which it floats, melted by a gentle heat, and strained—a part into a jar and closely sealed for keeping—the remainder into a mortar, and triturated with a little rose-water, until it is very white and creamy, for present use. It is usual to keep this ointment in glass jars without allowing any unfilled interstices, and to cover it with rose-water to prevent the access of air. Thus prepared Cucumber Ointment readily keeps from season to season.

Properties and Uses.—This forms an emollient application, very useful for chapped lips and hands, irritated and excoriated surfaces, etc.

UNGUENTUM FULIGINIS. *Ointment of Woodsoot.*

Preparation.—Take of Woodsoot, in very fine powder, *half an ounce*; Lard *two ounces*. Triturate them together.

Properties and Uses.—Applied on cotton batting this ointment is very useful in burns, and erysipelatous inflammations; and is also beneficial in tinea capitis, and several cutaneous diseases.

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Creosote

Wood Soot

UNGUENTUM GALLÆ. *Ointment of Galls.*

Preparation.—Take of Galls, in powder, *an ounce*; Lard *seven ounces*. Triturate them together.—*U. S.*

Properties and Uses.—This ointment is useful in prolapsus ani, piles, flabby and indolent ulcers. When the piles are irritable, half a drachm of pulverized opium may be advantageously added.

UNGUENTUM IODINII COMPOSITUM. *Compound Ointment of Iodine.*

Preparation.—Take of Iodine *half a drachm*; Iodide of Potassium *a drachm*; Alcohol *a fluidrachm*; Lard *two ounces*. Rub the Iodine and Iodide of Potassium first with the Alcohol, and then with the Lard until they are thoroughly mixed.—*U. S.*

Properties and Uses.—This preparation is used as a local application, in goitre, scrofulous, and other chronic enlargements and in opacities of the cornea; the discoloration of the skin occasioned by its use gradually disappears. Applied twice a day to enlarged tonsils, by means of a camel's hair pencil, it has caused the enlargement to disappear in the course of two months. It probably acts through the medium of absorption. It is better to prepare it only as it is required for use.

UNGUENTUM IPECACUANHÆ. *Ointment of Ipecacuanha.*

Preparation.—Take of Ipecacuanha, in powder, *two drachms*; Olive Oil *two fluidrachms*; Lard *half an ounce*. Mix together

Properties and Uses.—Rubbed on the skin for a few minutes, once or twice a day, this ointment produces an eruption. It is used as a counter-irritant in diseases of the throat, and in pulmonary affections is applied to the chest. When it is desired to make it more active, Croton Oil *a fluidrachm and a half*, may be added to the above formula. If rubbed on the surface for twenty or thirty minutes at a time, repeated three or four times a day, and covered with flannel after each application, it will produce vesicles in thirty-six hours.

UNGUENTUM MEZEREL. *Ointment of Mezereon.*

Preparation.—Take of Mezereon, sliced transversely, *four ounces*; Lard *fourteen ounces*; White Wax *two ounces*. Moisten the Mezereon with a little Alcohol, and beat in an iron mortar until reduced to a fibrous mass; then digest it by means of a salt-water bath, with the Lard and Wax previously melted together, for twelve hours; strain with strong expression, and allow the strained liquid to cool slowly, so that any undissolved matters may subside. From these separate the medicated ointment.—*U. S.*

Properties and Uses.—This is used as a stimulating application to obstinate, ill-conditioned, and indolent ulcers; likewise to blistered surfaces, in order to maintain the discharge.

UNGUENTUM MYRICÆ. *Ointment of Bayberry.*

Preparation.—Take of Bayberry Tallow, White Turpentine, of each, *half a pound*; Olive Oil *four ounces*. Melt together and strain.

Properties and Uses.—This forms an excellent application to scrofulous ulcers, and indolent ulcers generally.

UNGUENTUM MYRICÆ COMPOSITUM. *Compound Ointment of Bayberry.*

Preparation.—Take of Bayberry Tallow, Sweet Gum, each, *half a pound*; Suet *a pound*. Melt together and strain.

Properties and Uses.—This ointment is very advantageous in scrofulous ulcers, tinea-capitis, porrigo scutulata, itch, salt-rheum, and several other forms of cutaneous disease; also in itch, piles, and fistulous ulcers. In fistula and some cutaneous diseases the addition of three or four drachms of Sulphate of Zinc, in powder, will be found beneficial.—*J. K.*

UNGUENTUM PHYTOLACCÆ. *Ointment of Poke.*

Preparation.—Take of the Leaves of Poke, collected just before the ripening of the berries, *four pounds*; Lard *one pound*; Spirits *one pint*; Wax *two ounces*. Mix, and slowly simmer together until the Leaves are crisp, and then express through linen.

An ointment is sometimes made by mixing *one drachm* of the Powdered Poke Leaves or Root, or of the Extract of Poke, with *one ounce* of Lard.

Properties and Uses.—This is used as an application to ulcers, porrigo, tinea-capitis, and other cutaneous affections, and as a discutient to various tumors.

UNGUENTUM PICIS LIQUIDÆ. *Ointment of Tar.*

Preparation.—Take of Suet *one pound*; Tar *one pound*. Melt the Suet, then add the Tar, and stir constantly until cold.

Properties and Uses.—This forms a stimulant application in various scabby and scaly eruptions, particularly in psoriasis, and in that form of porrigo usually called tinea-capitis, or scald-head. In this last named disease, it should be applied night and morning; and in bad cases the patient should constantly wear a cap, thickly spread with the ointment upon its internal surface.

UNGUENTUM PIPERIS NIGRI. *Ointment of Black Pepper.*

Preparation.—Take of Prepared Lard *a pound*; Soot *four ounces*; Tar *one pint*; Black Pepper, in powder, *four ounces*. Melt the Lard and Tar together, then add the Soot and Pepper.

Properties and Uses.—This is used in tinea-capitis, in the same manner as the preceding ointment.

UNGUENTUM PLUMBI COMPOSITUM. *Compound Lead Ointment. Moyer's Ointment.*

Preparation.—Take of Olive Oil *two pounds and a half*; White Turpentine *half a pound*; Beeswax, Unsalted Butter, of each, *four ounces*; Red Lead *one pound*; Honey *twelve ounces*; Powdered Camphor *half a pound*. Melt the Olive Oil, White Turpentine, Beeswax and Butter

together, and strain; then heat them to nearly the boiling point, and gradually add the Red Lead, stirring the mixture constantly until it becomes black or brown. Then remove from the fire, and when it has become somewhat cool, add to it the Honey and Camphor, previously mixed together.

Properties and Uses.—This forms a very beneficial ointment for all kinds of ulcers, cuts, wounds, and several cutaneous diseases. It is of a more solid consistence than ointments are generally. It is highly prized by the German population, who have held it for a long time, as a secret among themselves. The profession are indebted to Mr. Jos. P. Mayer, of Cincinnati, for a knowledge of it.

UNGUENTUM POTASSII CYANURETI. *Ointment of Cyanuret of Potassium.*

Preparation.—Take of Cyanuret of Potassium *twelve grains*; Oil of Almonds *two drachms*; Cold Cream *two ounces*. Triturate together.

Properties and Uses.—This is used as an application to the sound skin, in neuralgia.

UNGUENTUM POTASSII SULPHURETI. *Ointment of Sulphuret of Potassium.*

Preparation.—Take of Sulphuret of Potassium *three drachms*; Carbonate of Soda *three ounces*; Lard *three ounces*. Triturate thoroughly together.

Properties and Uses.—This ointment is useful in ringworm, itch, and other forms of cutaneous disease.

UNGUENTUM SABINÆ. *Ointment of Savin.*

Preparation.—Take of fresh Savin Leaves, Yellow Wax, each, *eight ounces*; Lard *two pounds*. Boil gently together until the leaves are crisp, and strain.

Properties and Uses.—This preparation is stimulant, and is used for maintaining discharges from ulcers, blisters, etc.

UNGUENTUM SCROPHULARIÆ. *Ointment of Figwort.*

Preparation.—Take of fresh Figwort Leaves *two pounds*; Lard *one pound*; Tallow *half a pound*. Boil together until the Leaves are crisp, and then strain with expression.

Properties and Uses.—This ointment is useful in piles, painful tumors, ulcers, and cutaneous diseases; Dr. W. Stokes considers it a specific in gangrenous pemphigus.

UNGUENTUM SIMPLEX. *Simple Ointment.*

Preparation.—Take of White Wax *a pound*; Lard *four pounds*. Melt them together, with a moderate heat, and stir them constantly till they are cold.

Properties and Uses.—This is an emollient ointment, employed as a mild dressing to ulcers, blisters, and excoriated surfaces, and frequently

used as a vehicle for the application of more active substances ; it also serves as a basis for several other ointments.

UNGUENTUM STRAMONII. *Ointment of Stramonium.*

Preparation.—Take of Extract of Stramonium Leaves *a drachm*; Lard *an ounce*. Rub the Extract with a little Water until uniformly soft, and then with the Lard.—*U. S.*

This ointment may likewise be made as follows, but the preparation is inferior to that made according to the formula just given: Take of fresh Stramonium Leaves, cut in pieces, *one pound*; Lard *one pound*; Yellow Wax *three ounces*. Boil together until the Leaves become crisp, and then strain with expression.

Properties and Uses.—This forms an anodyne ointment, which will be found serviceable in irritable ulcers, burns, scalds, irritable cutaneous diseases, painful hemorrhoids, and as a discutient to indolent tumors.

UNGUENTUM STRAMONII COMPOSITUM. *Compound Ointment of Stramonium. Discutient Ointment.*

Preparation.—Take of the Bark of the Root of Bittersweet, Stramonium Leaves, Cicuta Leaves, Deadly Nightshade, Yellow Dock Root, each, *two ounces*; Lard *one pound*; Venice Turpentine *two ounces*; Spirits *a sufficient quantity*. Bruise the Roots and Leaves, cover them with Spirits, and allow them to digest with a moderate heat for four hours, then add the Lard and continue the heat until the Leaves are crisped. Lastly, strain and express through linen, add the Turpentine, and stir constantly till cold.

This ointment may likewise be made by mixing together, *two ounces* each, of the Ointments of the articles prepared separately, and the Turpentine. The Ointments to be prepared as follows: those of the Yellow Dock Root, and Bittersweet Bark, to be made by beating each separate article in the recent state, with Lard, after the manner for preparing Cucumber Ointment; the remaining Ointments, each to be prepared from the extracts of the several articles, after the manner for preparing Stramonium Ointment.

Properties and Uses.—This ointment is exceedingly valuable in discussing scrofulous, indolent, and all glandular tumors or swellings. It should be rubbed on the parts, about thirty minutes at each application; after which cover the part with cotton, and secure it by a proper bandage.

UNGUENTUM SULPHURIS. *Ointment of Sulphur.*

Preparation.—Take of Sulphur *a pound*; Lard *two pounds*; Oil of Bergamot *two and a half drachms*. Mix them.

Properties and Uses.—Sulphur ointment is considered a specific for the itch. It is generally applied every night till the disease is cured; and usually but one-fourth of the body is covered at a time. However, it has been applied over the whole surface of the body, daily, without

any unpleasant results. It will also be found useful in tinea-capitis, crusta-lactea, and several other cutaneous diseases.

UNGUENTUM SULPHURIS COMPOSITUM. *Compound Ointment of Sulphur.*

Preparation.—Take of Sulphur *half a pound*; White Hellebore, in powder, *one ounce*; Nitrate of Potassa *a drachm*; Soft Soap *half a pound*; Poke Ointment *a pound and a half*; Oil of Bergamot *two fluidrachms*. Mix the articles thoroughly together.

Properties and Uses.—This ointment is more irritating than the simple sulphur ointment; but, notwithstanding it will be found efficacious in the treatment of itch, especially when it proves very obstinate and unyielding to the milder treatment.

UNGUENTUM TABACI. *Ointment of Tobacco.*

Preparation.—Take of fresh Tobacco, cut in pieces, *an ounce*; Lard *a pound*; Yellow Wax *one ounce*. Boil the Tobacco in them over a gentle fire till it becomes friable; then strain through linen.

Properties and Uses.—Tobacco Ointment forms an anodyne application, useful in various cutaneous eruptions, especially tinea-capitis, in irritable ulcers, painful swellings, etc. In using it, great care must be taken not to produce its constitutional narcotic effects, by employing too large quantities of it. An ointment made from the dried leaves is of but little value; one made by rubbing twenty drops of the empyreumatic oil of tobacco with an ounce of simple ointment, forms an active preparation.

UNGUENTUM VERATRI ALBI. *Ointment of White Hellebore,*

Preparation.—Take of White Hellebore Root, in powder, *two ounces*; Oil of Lemons *twenty minims*; Lard *eight ounces*. Mix them.—*U. S.*

Properties and Uses. This ointment, being less disagreeable than sulphur ointment, is sometimes employed in itch with benefit; but it should be cautiously applied to children. The substitution of Poke Ointment for the Lard, will render it still more certain and effective.

UNGUENTUM VERATRÆ. *Ointment of Veratria.*

Preparation.—Take of Veratria *ten or twenty grains*; Lard *an ounce*. Triturate the Veratria in a little Olive Oil, and then add the Lard.

Properties and Uses.—This forms a powerful local stimulant, very useful in neuralgia, amaurosis, and paralysis. It must be employed with care.

UNGUENTUM ZINCI OXIDI. *Ointment of Oxide of Zinc.*

Preparation.—Take of Oxide of Zinc *an ounce*; Lard *six ounces*. Mix them.—*U. S.*

Properties and Uses.—This forms a mild astringent ointment, useful as a local application in chronic ophthalmia where the vessels of the eye

are relaxed, in several eruptions of the skin, in sore nipples, and in cases of excoriation or ulceration.

UNGUENTUM ZINCI OXIDI COMPOSITUM. *Compound Ointment of Oxide of Zinc.*

Preparation.—Take of Olive Oil *two pounds*; Spermaceti *twelve ounces*; White Wax *four ounces*; Oxide of Zinc *seven ounces*; Benzoic Acid *two drachms*; Sulphate of Morphia *forty-eight grains*; Oil of Roses *twenty minims*. Rub together in a mortar, until no specks are seen, the Oxide of Zinc, Benzoic Acid, Sulphate of Morphia, and Oil of Roses. Melt the Olive Oil, Wax, and Spermaceti together, and add the above triturated mass to it, stirring constantly till nearly cold.

Properties and Uses.—This forms a mild stimulating and astringent preparation, which is exceedingly useful in acute and chronic ophthalmia, opacities of the cornea, nebula, granulations of the lids, etc. It is likewise useful in many cutaneous diseases, and may be advantageously employed as a dressing to wounds and indolent ulcers.

It is somewhat similar to a preparation which has been extensively sold under the name of "*Pettit's Ophthalmic Balsam or Eye Salve*," and the formula of which is as follows: Take of White Precipitate *three ounces*; Oxide of Zinc *four ounces*; Benzoic Acid *two drachms*; Sulphate of Morphia *forty-eight grains*; Oil of Rosemary *twenty drops*. Rub these thoroughly together, in a mortar, until they are well incorporated, and then add them gradually to a warm compound made by melting together Olive Oil *two pounds*; Spermaceti *twelve ounces*; White Wax *four ounces*; stirring constantly till cold.

A preparation of a similar character, known as *Brown or Ophthalmic Ointment*, has enjoyed considerable reputation in the east, in the treatment of Ophthalmic diseases; it is composed of Red Precipitate *two and a half drachms*; Oxide of Zinc *one drachm*; Fresh Butter *three ounces*; White Wax *half an ounce*; Camphor, dissolved in Olive Oil, *one drachm*. Mix. It is a French preparation.

UNGUENTUM ZINCI SULPHURATIS. *Ointment of Sulphate of Zinc.*

Preparation.—Take of Sulphate of Zinc *one scruple*; Fresh Butter *two drachms*. Triturate together.

Properties and Uses.—This Ointment is very beneficial in eruptions of the skin, fungous growths, gangrenous and indolent ulcers, fistula, hemorrhoids, ulcerations of the cornea, etc. If it acts too severely it may be rendered milder by the addition of butter in necessary quantity.

VERATRIA.

Veratria.

Preparation.—Take of Cevadilla, bruised, *two pounds*; Alcohol *three gallons*; Sulphuric Acid, Solution of Ammonia, Purified Animal Char-

coal, Magnesia, each, *a sufficient quantity*. Boil the Cevadilla in a gallon of the Alcohol, in a retort with a receiver attached, for an hour, and pour off the liquor. To the residue add another gallon of the Alcohol, together with the portion recently distilled; again boil for an hour, and pour off the liquor. Repeat the boiling a third time with the remaining Alcohol, and with that distilled in the previous operation. Press the Cevadilla, mix and strain the liquors, and by means of a water-bath distil off the Alcohol. Boil the residue three or four times in Water acidulated with Sulphuric Acid, mix and strain the liquors, and evaporate to the consistence of syrup. Add Magnesia in slight excess, shake the mixture frequently, then express, and wash what remains. Repeat the expression and washing two or three times, and, having dried the residue, digest it with a gentle heat several times in Alcohol, and strain after each digestion. Distil off the Alcohol from the mixed liquors, boil the residue for fifteen minutes in Water with a little Sulphuric Acid and Purified Animal Charcoal, and strain. Having thoroughly washed what remains, mix the washings with the strained liquor, evaporate with a moderate heat to the consistence of Syrup, and then drop in as much Solution of Ammonia as may be necessary to precipitate the Veratria. Lastly, separate and dry the precipitate.—*U. S.*

History.—By the above process, a Tincture of Cevadilla is first obtained, which is subsequently evaporated to the consistence of an extract, which contains the veratria combined with some vegetable acid. The veratria is dissolved from the extract by the acidulated water, which converts the greater portion of it into a sulphate; an excess of the native acid holding the remainder in solution. The sulphuric acid combines with the magnesia, when added, forming a sulphate of magnesia, while the veratria is precipitated, again dissolved by alcohol, and purified by evaporation. For further purification it is again dissolved in acidulated water, acted upon by animal charcoal, and finally precipitated by ammonia. A drachm of impure veratria is, by the above method, obtained from a pound of cevadilla.

The veratria produced by this process, though sufficiently pure for medical purposes, is not wholly free from other principles; M. Couerbe states that *Sabadillia* and *Veratrin* are also contained in it. They may be separated as follows: To the solution of the impure sulphate of veratria obtained by the above process, add nitric acid, gradually, by drops, and decant the clear liquor from the abundant precipitate which ensues. To this liquor add a weak solution of potassa, which will also produce a precipitate; wash this precipitate with cold water, and dissolve it in boiling alcohol. On evaporating the alcohol, the product yields the *sabadillia* to boiling water, which deposits it upon cooling; a *resini-gum* of *sabadillia*, so named by M. Couerbe remaining in solution. After the action of the boiling water upon the product, if this be again acted upon by ether, the veratria will be dissolved, and may be obtained

entirely pure by the spontaneous evaporation of the ether. The remaining undissolved resinous substance is called *Veratrin* by M. Couerbe. *Sabadilla* is a white, crystallizable, most intensely acrid substance, fusible by heat, readily soluble in hot water, but deposited upon cooling, very soluble in alcohol, and wholly insoluble in ether. It is capable of saturating the acids. Simon states it to be a compound of resinate of soda and resinate of veratria.

Mr. Jas. Beatson, of the U. S. Naval Laboratory, N. Y., has given the following process for procuring veratria, which he considers superior to any other in use: Seventy-three pounds (avoirdupois) of *sabadilla* were rubbed upon a coarse wire sieve, which separated the seed from the capsules, and reduced to a coarse powder, in Swift's drug mill. Finding that a portion of the veratria was still retained with the membranous follicle, he also passed the capsules through the mill, which, from their elasticity, were but coarsely comminuted; the finer portions he separated with a coarse sieve, and mixed with the ground seeds, moistened with alcohol, and allowed them to stand for twelve hours. He then introduced them into a displacement apparatus, and exhausted them thoroughly with rectified alcohol, in the following manner: Into the displacement apparatus he introduced thirty gallons of rectified alcohol, and when a quantity had percolated sufficient to fill his still, he commenced distillation—returning the recovered alcohol into the displacement apparatus and continuing the percolation and distillation, until the seeds were thoroughly exhausted—collected all the alcohol he could from the exhausted seeds, and continued the distillation until the tincture, in the bottom of the still, was of a syrupy consistence, poured this, while hot, into eight times its volume of cold water, threw the whole upon a calico filter, and washed with cold water, until the washings ceased to indicate the presence of veratria; mixed the washings with what passed first through the filter, and added liquor ammoniæ in excess (about four pounds), which precipitated the veratria with a little of the coloring matter. Washed the precipitate with cold water which removed the greater portion of the coloring matter. Dried with a very gentle heat, and when the moisture was completely expelled, eleven and a quarter ounces of pure veratria were obtained, with but a faint shade of coloring matter.—*Am. Jour. Pharm.*, Vol. xxvi, p. 2, 1854.

Pure Veratria is white, uncrystallizable, pulverulent, inodorous, extremely acrid, fusible by heat, scarcely soluble in cold water, soluble in a thousand parts of boiling water, which it renders sensibly acrid, freely soluble in alcohol, less so in ether, neutralizing the acids, forming crystallizable salts with several of them, especially the muriatic and sulphuric. The ordinary commercial veratria is a grayish-brown or grayish-white powder, of an overpowering, bitter, acrid taste, producing a sense of tingling or numbness in the tongue, and powerfully irritating to the nostrils, causing, when admitted into them, violent sneezing and

mucous discharge. According to Couerbe the composition of sabadilla is $C_{20} H_{13} O_5 N$, and that of pure veratria $C_{34} H_{22} O_6 N$. Veratria may be used in the uncombined state, or united with acids, as in both forms it produces essentially the same effects.

Veratria is uncrystallizable, fusible, combustible, entirely dissipated by a red heat, becomes intensely red upon contact with concentrated sulphuric acid, forms a yellow solution with nitric acid, and its solution in dilute acetic acid gives white precipitates with ammonia and the infusion of galls.

Properties and Uses.—Veratria is a powerful irritant, capable of producing inflammation in the parts to which it is applied, and extending a peculiar action to the nervous system. Rubbed upon the skin it excites a sensation of warmth, and a peculiar tingling, which, when the application is continued for a considerable length of time, extends, according to Turnbull, over the whole surface of the body. Sometimes an evanescent blush is produced, and still more rarely, an eruption upon the skin; but, according to the same author, no marks of inflammation are, in general, evinced. Upon the denuded cutis, however, veratria and its salts are powerfully irritating, so much so as to prevent their advantageous application in this way. In the mouth and fauces, they produce an almost insupportable sense of acrimony; and snuffed up the nostrils, excite violent sneezing. Magendie informs us that when taken internally, in the dose of a quarter of a grain, they promptly produce abundant alvine evacuations, and in larger doses, provoke more or less violent vomiting. Dr. Turnbull, on the contrary, says that he has very seldom found them to purge, even when largely administered, and that not unfrequently a state of constipation comes on during their employment, requiring the use of aperient medicine. According to this author, their first effect, when given in moderate doses, is a feeling of warmth in the stomach, gradually extending itself over the abdomen and lower part of the chest, and ultimately to the head and extremities. If the medicine is continued, this feeling of warmth is followed by a sense of tingling, similar to that produced by the external use of the medicine, which manifests itself in different parts of the body, and sometimes over the whole surface, and is frequently accompanied by perspiration, and some feeling of oppression. Occasionally, also, diuresis is produced. A still further continuance of the medicine, or the use of large doses, excites nausea and vomiting. It occasions no narcotic effects.

The diseases in which veratria has been employed are chiefly gout, rheumatism, and neuralgia. Dr. Turnbull has found it useful, also, in dropsy, and in diseases of the heart, particularly those of a functional character. He thinks he has also seen it do good in organic diseases of this organ, but chiefly by acting as a diuretic, and thereby removing effusion in the pericardium. For internal use, the salts of veratria are

preferred. From one-twelfth to one-sixth of a grain may be given in the form of pill, and repeated every three hours till the effects of the medicine are experienced. Dr. Turnbull prefers the tartrate, as less disposed to irritate the stomach. The sulphate or acetate, however, may be used. Any one of these salts may be readily prepared by treating veratria with water, acidulated with the acid to perfect neutralization, and then evaporating to dryness.

But veratria is much more employed externally than by the stomach, and is applicable, in this way, to all the complaints already mentioned. It may be used either dissolved in alcohol, or rubbed up with lard, or other unctuous substance, in the proportion of ten to twenty grains or more to the ounce. Of the ointment thus prepared, Dr. Turnbull directs a portion, of the size of a large nut, to be rubbed upon the skin, over the part affected, night and morning, from five to fifteen minutes, or until the more urgent symptoms are relieved. Veratria may be used in this way to the amount of from four to eight grains a day. Care must be taken that the cuticle is sound over the parts to which it is applied. When the skin is irritable, smaller quantities than those above mentioned must be used.—*U. S. Disp.*

VINA MEDICATA.

Medicated Wines.

By Medicated Wines we mean the tinctures of those medicinal agents which are insoluble in water, or which do not require as stimulant a solvent as rectified or proof spirit, but which are capable of yielding their virtues to wine, either pure or diluted. As a general thing vinous tinctures are much inferior to alcoholic, on account of their liability to undergo decomposition, and the uncertainty of their strength, and should, therefore, be prepared in small quantities, without heat, and kept in well stopped bottles in a cool place. Bitters and cordials have, heretofore, been among the prominent medical agents peculiar to Eclectic practice, a few of which are yet retained, and some of which we have placed under the present head in order to avoid the introduction of a new class of pharmaceutical preparations; yet, from the consequences following a course of treatment by bitters, viz: the cultivation of a taste or appetite for alcoholic stimulus, it is to be hoped, that even these will eventually be dispensed with for means and preparations fully as efficacious, and without the evil results which sometimes occur from their use.

Wines owe their solvent properties to the alcohol which they contain, as well as to acid which they usually hold in greater or less proportion; and in the selection of them for medical purposes, the purest qualities only should be selected—those most commonly employed are Sherry, Madeira, and Teneriffe. Sherry Wine is preferable to all others in preparing medicated wines, as being less liable to change or decomposition;

probably *native wine* would answer, but it has not been fully tested in these preparations.

VINUM CINCHONÆ COMPOSITUM. *Compound Wine of Peruvian Bark.*

Preparation.—Take of Peruvian Bark *two ounces*; Wild Cherry Bark, Sulphur, of each, *one ounce*; Cinnamon, Cloves, Nutmegs, of each, *one drachm*; Sherry Wine, or Native Wine *four pints*. Macerate for seven days and filter.

Properties and Uses.—This is a valuable agent in intermittent fever, and in chronic diseases attended with symptoms of a periodical character. The dose is two fluidounces, every one, two, or three hours, during the intermission. It is at present superseded by other preparations.

VINUM COLCHICI RADICIS. *Wine of Colchicum Root.*

Preparation.—Take of Colchicum Root, well bruised, *a pound*; Sherry Wine *two pints*. Macerate for fourteen days, with occasional agitation; then express strongly and filter through paper.

Wine of Colchicum Root may also be prepared by macerating as above, then transferring to a percolator, and, after the liquor has ceased to pass, pouring so much Wine upon the residue that the filtered liquor obtained may measure *two pints*.—*U. S.*

Properties and Uses.—The bulb of Colchicum which is imported into this country is very variable in strength, and the only method by which an active vinous solution of it can be ensured, is to use it in large proportion, as given in the formula, so as to be certain of procuring a saturated preparation. It is employed by some practitioners in gout, gouty rheumatism, and neuralgia, and will be found more decided in its influence, if given in connection with magnesia or its sulphate. In neuralgia it may be beneficially administered in combination with solution of sulphate of morphia. Overdoses may occasion serious results. The dose is from ten minims to a fluidrachm, three or four times a day, or oftener in severe cases, until its peculiar effects have manifested themselves.

VINUM COLCHICI SEMINIS. *Wine of Colchicum Seed.*

Preparation.—Take of Colchicum Seed, bruised, *four ounces*; Sherry Wine *two pints*. Macerate for fourteen days, with occasional agitation; then express, and filter through paper.—*U. S.*

Properties and Uses.—The seeds of Colchicum being of more uniform strength, and not so liable to injury as the bulb, do not require therefore to be used so largely in proportion to their menstruum as the bulb. This medicated wine may be employed for the same purposes as the wine of the bulb, or the tincture of the seeds. In overdoses it is capable of producing death. The dose is one or two fluidrachms. To obtain their full medicinal activity the seeds should always be bruised.

VINUM ERGOTÆ. *Wine of Ergot.*

Preparation.—Take of Ergot, bruised, *two ounces*; Sherry Wine *a pint*.

Macerate for fourteen days, with occasional agitation; then express and filter through paper.—*U. S.*

Properties and Uses.—This may be used during labor, as a parturient, in doses of two or three fluidrachms; in other instances it may be given in doses of one or two fluidrachms, three or four times a day, and gradually increased if desirable.

VINUM HÆMATOXYLI COMPOSITUM. *Compound Wine of Logwood. Golden Tincture.*

Preparation.—Take of Logwood Chips, Black Hellebore, bruised, of each, *four ounces*; Sherry Wine *three pints*. Macerate for fourteen days, express, and filter.

Properties and Uses.—This is cathartic, tonic, and emmenagogue, and will be found useful in chlorosis, amenorrhea, and some forms of dysmenorrhea. The dose is from half a fluidounce to two fluidounces, three times a day.

VINUM HYDRASTIS COMPOSITUM. *Compound Wine of Golden Seal. Wine Bitters.*

Preparation.—Take of Golden Seal Root, Tulip Tree Bark, Bitter Root, of each, bruised, *one drachm*; Capsicum *half a drachm*; Sherry Wine *four pints*. Macerate for fourteen days, with occasional agitation; then express, and filter.—*T. V. M.*

This vinous solution may also be prepared from the same dry materials, by covering them with Sherry Wine, allowing them to stand for one week, then transferring them to a percolator, and gradually adding Sherry Wine until four pints of filtered liquor are obtained.

Properties and Uses.—This forms a pleasant bitter tonic solution; it may be administered in dyspepsia and other complaints, where tonics are indicated. It is sometimes improperly made of Malaga Wine. Dose, from half a fluidounce to two fluidounces, three times a day.

A similar preparation is recommended by some authors. Take of Golden Seal Root, Tulip Tree Bark, Bitter Root, Orange Peel, each, *one drachm*; Prickly Ash Berries, in powder, *half a drachm*; add Boiling Water *half a pint*; Pour the Boiling Water on the rest of the articles mixed together, and let them stand in a closely covered vessel for twenty-four hours, and add Malaga Wine *one pint and a half*. (Good sweet Native Wine would be better.) Dose, same as above.

VINUM IPECACUANHÆ. *Wine of Ipecacuanha.*

Preparation.—Take of Ipecacuanha, bruised, or in powder, *two ounces*; Sherry Wine *two pints*. Macerate for fourteen days, with occasional agitation; then express and filter through paper.

Wine of Ipecacuanha may also be prepared by moistening the Ipecacuanha, in coarse powder, thoroughly with Wine, allowing it to stand

for twenty-four hours, then transferring it to a percolator, and pouring Wine gradually upon it until two pints of filtered liquor are obtained.—*U. S.*

Properties and Uses.—This wine possesses all the medical qualities of the root, and as an emetic is sometimes preferred in infantile cases. It may be used also as an expectorant or diaphoretic. Dose, as an emetic for an adult, a fluidounce; for a child one or two years old, a fluidrachm, repeated every fifteen minutes till it operates; as an expectorant and diaphoretic, from ten to thirty drops.

VINUM PHYTOLACCÆ COMPOSITUM. *Compound Wine of Poke. Rheumatic Liquid.*

Preparation.—Take of Inspissated Juice of Poke Berries, White Turpentine, of each, *four ounces*; Sherry or Native Wine *two gallons*. Macerate for fourteen days, with occasional agitation, and filter.

Properties and Uses.—This is an excellent preparation for chronic rheumatism, chronic gonorrhea, syphilitic pains, etc. The dose is from half a fluidounce to a fluidounce, two or three times a day.

VINUM SAMBUCI. *Wine of Elder. Hydragogue Tincture.*

Preparation.—Take of Elder Bark, bruised, *one pound*; Sherry Wine, or Native Wine *one gallon*. Macerate for fourteen days, express, and filter through paper.

This medicated wine may also be prepared by macerating powdered Elder Bark, in Wine, for twenty-four hours, then transferring it to a percolator, and gradually adding Wine until one gallon of filtered liquor is obtained.

Properties and Uses.—Wine of Elder is useful in dropsical affections, especially ascites, and dropsy supervening upon scarlatina or other exanthematous diseases. Dose, two ounces, three or four times a day. This preparation may be made for immediate use by digesting the articles with heat for an hour.

VINUM SYMPHYTI COMPOSITUM. *Compound Wine of Comfrey. Restorative Wine Bitters.*

Preparation.—Take of Comfrey Root, Solomon's Seal Root, Spikenard Root, of each, bruised, *one ounce*; Chamomile Flowers, Colombo Root, Gentian Root, of each, bruised, *half an ounce*; Sherry Wine *four pints*; Boiling Water *a sufficient quantity*. Place the Herbs in a vessel, cover with Boiling Water, and let the compound macerate for twenty-four hours, keeping it closely covered; then add the Sherry Wine. Macerate for fourteen days, express, and filter.

Malaga Wine, or Metheglin, which are sometimes used in this preparation, are inferior to Sherry Wine, and more liable to decomposition. The addition of Sugar to this Wine of Comfrey, is very apt to disagree with many persons, and thus destroy its efficacy.

Properties and Uses.—This is a most valuable tonic in all diseases peculiar to females, especially leucorrhea, amenorrhea, weakness of the back, etc. The dose is from half a fluidounce to two fluidounces, three or four times a day.

A similar preparation, made as follows, is also recommended: Take of Spikenard Root, Solomon Seal Root, Gentian, Wild Cherry Bark and Peach Root, of each, bruised, *one ounce*; add Boiling Water *four pints*, simmer slowly to *one pint*; then add Native Wine *four pints*. Macerate for seven days, express, filter, and add Loaf Sugar *two ounces*. Dose, as above.

I have recently been informed that the custom of triturating concentrated remedies, with sugar, or sugar of milk, and presenting them as the pure articles, is now no longer carried on; in fact, that the establishment at which this was practiced is no longer in existence. I am very glad of this, as such a course was calculated to seriously injure the cause of Eclecticism. However, lest some of these triturated preparations should fall into the hands of practitioners, I will name the method of detecting them. If the preparation is agitated with absolute alcohol or ether, the *sugar of milk* will not be dissolved, but the oil, resin, or coloring matter, may be taken up; if it be agitated with six parts of cold water, the sugar will be dissolved, and sometimes the coloring matter will be taken up, but the oil or resin will separate on standing; on the addition of an excess of absolute alcohol to its aqueous solution, the sugar of milk falls in a crystalline state. If *sugar* be present in the aqueous solution, it will not be precipitated by sub-acetate of lead; it will dissolve in half its weight of cold water, from which it may be precipitated by an excess of absolute alcohol. A small quantity of yeast added to the solution in which sugar exists, will occasion fermentation.

I would state that some of our oils and oleo-resins are now prepared in the form of powder, by combining them with an alkali; many of these are very active, but they lose their activity by keeping, and hence are not as valuable as the original articles without the alkali. Yet when of recent manufacture, these alkaline powders may be very useful in many instances.—*J. K.*



PART IV.

A P P E N D I X.

EXPLANATION

OF THE PRINCIPAL ABBREVIATIONS OCCURRING IN PHARMACEUTICAL FORMULÆ.

R. Recipe—Take.

F. S. A. Fiat secundum artem—Let it be made or prepared according to the rules of the art.

M. Misce—Mix.

M. S. D. Misce, signa, da—Mix the medicine, and deliver it afterward, with the requisite instruction, to the patient (or nurse) in writing.

M. F. P. Misce fiat pulvis—Mix to form a powder.

M. F. Mixt. Misce fiat mixtura—Mix to form a liquid mixture.

M. F. Pil. Misce fiant pilulæ—Mix to form pills.

Div. Divide—Divide.

Sol. Solve—Dissolve.

Fasc. j. Fasciculus—An armful.

Man. j. Manipulus—A handful, a gripe.

Pugil. j. Pugillus or Pugillum—A pinch.

Cyat. j. Cyathus—A glassful.

Cochl. j. Cochlear or Cochleare—A spoonful.

Gutt. Gutta—Drop.

No. 1, 2, 3, etc. The number of pieces or parts.

Ana, or āā. Of each.

P. Ae. Partes æquales—Equal parts.

Q. S. Quantum sufficit—As much as will suffice.

Q. L. Quantum libet—As much as you like.

Q. V. Quantum volueris—As much as you like.

℔. Libra—A pound.

℥. Uncia—An ounce.

ʒ. Drachma—A drachm or dram.

ʒj. Scrupulus—A scruple.

Gr. Granum—A grain.

Pil. Pilula—A pill.

Pot. Potio—A potion.
 Pulv. Pulvis—A powder.
 Tinc. Tinctura—A tincture.
 Ext. Extractum—An extract.
 Chart. Chartula—A small paper.
 Collyr. Collyrium—An eye-water.
 Collutor. Collutorium—A mouth wash.
 Cong. Congius—A gallon.
 O. Oct. Octarius—A pint.
 f3. Fluiduncia—A fluidounce.
 f3. Fluidrachma—A fluidrachm.
 ℥. Minimum—A minim.
 Decoct. Decoction—A decoction.
 Garg. Gargarisma—A Gargle.
 Haust. Haustus—A draught.
 Infus. Infusum—An infusion.
 Mass. Massa—A mass.
 Mist. Mistura—A mixture.
 Ss. Semis—A half.

A VOCABULARY

OF THE WORDS MOST FREQUENTLY OCCURRING IN THE PRESCRIPTIONS OF PHYSICIANS.

A.

A, āā, or ana, of each ingredient; more properly expressed by the genitive case plural (singulorum) of each; for instance:

R.—Aquæ cinnamon, tinct. rhei. āā ʒij, means.

Take of cinnamon-water, and tincture of rhubarb, of each two drachms.

Abdomen, the belly. Gen.—inis, of the belly. Dat.—ini, to the belly.

Absente febre, while the fever is off.

Accuratè (adverb) accurately. Accuratè pensi, Acc. pen., weighed with the utmost exactness. Accuratè misceantur, Acc. mis., mix very completely.

Aciditas, sharpness. Ad gratam aciditatem, make it just acid enough to be palatable, and not too sour.

Acme, the height of the fever or any other disease.

Ad, to. Ad duas vices, at twice taking. Ad libitum, as you like.

Adde, add. Addantur, let there be added. Addendus, to be added.

Addendo, adding.

- Admoveatur, let there be applied — antur, plural, when more than one is to be applied.
- Adstante febre, while the fever is on.
- Æger, a sick person, a patient. Ægra, a female patient.
- Aggrediente febre, when the fever is coming on.
- Aggressus, an attack. Aggressus febris, the attack of a fever.
- Agitato vasè, shaking the vial.
- Albus, white.
- Aliquot, some. Aliquoties, sometimes.
- Alter, altera, alterum, the other.
- Alternus, alternate. Alternis horis, every second hour. Alternis diebus, every alternate day.
- Aluta, leather. Extende super alutam mollem, E. S. A. M., spread on soft leather.
- Alvus, the belly, the bowels. Adstrictâ alvo, when costive.
- Amplus, large. Cochleare amplum, a tablespoonful.
- Antè, before. Ut antè, as before.
- Antemeridianus, in the forenoon; any time before twelve o'clock at noon.
- Apparatus, any sort of a preparation, instruments, or, in short, everything that is requisite to be had in readiness for performing any sort of operation. Also, the more delicate term for a bladder and pipe for clysters.
- Aperiens, opening, gently purging.
- Applicetur, let there be applied.
- Aqua, water. Aquæ, of water. Aqua bulliens, Aqua fervens, boiling water.
- Armatus, armed. Fistula armata, an apparatus for clysters; a pipe and bladder.
- Auris, the ear. Auri, to the ear. Aures, ears. Auribus, to the ears.
- Aut, or.

B

- Benè, well. Benè misceatur, B. M., let it be well mixed.
- Bibat, let him drink.
- Biduum, two days. Omni biduò vel triduò, every two or three days.
- Bihorium, the space of two hours. Omni bihorio, every two hours.
- Bis, twice: bis, terve, twice or thrice.
- Bullio, to boil; bulliens, boiling. Aquæ bullientis, of boiling water.
- Bulliant, let them boil.

C.

- Calefactus, made warm.
- Capiat, let (the patient) take. Capt. cochl. iij magn., three tablespoonfuls to be taken.
- Catharticus, purging.

- Cautè, cautiously.
- Cerevisia, beer. Cerevisia Londinensis, porter. Cerevisia Lagenaria, bottled porter or stout.
- Charta, paper. Charta cærulea, blue paper. Chartula, a little piece of paper. Cola trans chartam, filter through paper.
- Cibus, food.
- Circa, about. Circiter, about.
- Citò, soon, quickly. Citissimè (the superlative degree,) as quick as possible.
- Clausus, clausa, clausum, covered. Vase clauso, in a covered vessel.
- Cochleare, a spoonful. Cochlearia, spoonfuls. Coch. magnum, amplum, a tablespoonful. Co. infantulorum, coch. modicum, child's spoonful, a dessertspoonful. Co. parvum, a teaspoonful.
- Coctio, a boiling. Sub finem coctionis, toward the end of the boiling; when almost boiled.
- Cæruleus, blue. Charta cærul., blue paper. Unguentum cæruleum, mercurial ointment.
- Cola, (imperat. of Colo,) strain, to filter.
- Colatus, strained, filtered. Colato liquori, to the strained liquor.
- Colatura, a straining. Colaturæ, to the strained liquor.
- Colatus, let be strained. Colentur, let them be strained.
- Collum, a neck.
- Comp., Compositus, compound.
- Continuo, to continue. Continuantur remedia, go on with the same medicine as last prescribed.
- Contundo, to bruise. Contusus, bruised.
- Contusio, a bruise, a contusion.
- Coquo, to boil. Coque, boil. Coque parùm, boil a little while.
- Coquantur, let them be boiled.
- Cor, the heart. Scrobiculus cordis, the pit of the stomach.
- Coxa, Coxendix, the hip.
- Cras, to-morrow; c. m. cras mane, early to-morrow morning; C. M. S., cras mane sumendus, to be taken early to-morrow morning.
- Crastinus (adj.,) of to-morrow. In usum crastinum, for to-morrow's use.
- Cribrum, a sieve. Trans cribrum, through a sieve.
- Cujus, of which. Cujus capiat, or sumat, of which (the patient is to) take.
- Cum, with.
- Cyathus, a cup. Cyathus vinarius, a wineglass. Cyath. theat, a tea-cup full.

D.

- Da, give. Detur, dentur (plural,) let be given.
- De, of. De quo, or quâ, of which. De die, in a day.

- Deauratus, gilt. Deaurentur pilulæ, let the pills be gilt.
 Debilitas, weakness.
 Decem, ten. Decimus, the tenth.
 Debitus, due. Ad debitam spissitudinem, to a proper degree of thickness, as to consistence.
 Decubitus, lying down. Horâ decubitûs, at bedtime.
 Deglutio, to swallow. Deglutiatur, is swallowed—etur, let be swallowed.
 Dein, deinde, then; afterward.
 Dejectio, a depositing, or putting down, also a going to stool; as, post duas dejectiones alvi, after two motions.
 Dejitio, to deposit. Donec alvus bis dejiciat, until the patient shall have had two stools.
 Dexter, the right. Manus dextra, the right hand. Auri dextro, to the right ear.
 Dictus, spoken of, said.
 Dies, a day. Die in a day; as bis die, twice a day. Diebus, in days; as, tertiis diebus, every third day. Alternis diebus, every alternate day.
 Dilutum, diluted.
 Dimidium, the half. Dimidius, a, um (adjective,) half.
 D. P., Directione propria, with its proper direction.
 Diu, a long time. Tere diu, rub for a long time.
 Diuturnus, long-continued. Diuturnâ trituratione, D. trit. by long continued rubbing, or grinding in the mortar. Diuturna coctione, by long boiling.
 Dolor, pain. Dolores, pains. Doloris, of the pain.
 Dolens, pained. Parti dolenti, to the pained part.
 Donec, until. Donec liquescat, till it melts. Dum, whilst.
 Durante dolore, while the pain continues.

E.

- Eadem, eandem, the same. Eodem, in the same.
 Effunde, pour out.
 Effervescentia, the effervescence.
 Effervescet, effervesces.
 Ejusdem, of the same, the genitive case of idem.
 Enema, a clyster. Enemata, clysters.
 Erit, shall be.
 Evanescio, evanui; to disappear. Evanuerit, shall have disappeared.
 Exhibe, Exhibeatur, give. Exhibendus, to be given.
 Extendo, to extend, also to spread. Extende super alutam, spread it on leather.
 Extensus, a, um, spread.

F.

Fac, make. Fac in pilulas xij, make into twelve pills.

Farina, flour. Farina seminis lini, linseed meal.

Febris, a fever. Febre durante, while the fever is on.

Femur, a thigh.

Femoribus, to the thighs. Femoribus internis, to the inner sides of the thighs.

Fervens, boiling. Fervidus, fervida, hot.

Ferventis, of boiling. R aq. ferventis, take of boiling water.

Finis, the conclusion. Sub finem coctionis, when almost boiled enough.

Fiat, make (the singular number). Fiant, make (plural).

Fontana, fountain. Aqua fontana, spring water.

Formula, prescription.

Fotus, a fomentation.

Fuerit, shall have been; as, donec alvus soluta fuerit, until a motion is (or shall have been) procured.

G.

Gargarisma, a gargle.

Gelatina, jelly. Gelatina ribesiorum, currant jelly. Gelatina quovis, any sort of jelly.

Globulus, a little ball. Globuli Gascoigni, Gascoign's ball. Donec globuli evanuerint, until the globules (of quicksilver) totally disappear (so that they can not be seen even with a microscope).

Gradatim, by slow degrees.

Gratus, grata, gratum, agreeable, pleasant. Ad gratum aciditatem, so as to make it pleasantly acid without being too sour. In quovis grato vehiculo, in any agreeable vehicle.

Gutta, a drop. Guttæ, drops. Guttas, drops.

Guttatim, drop by drop.

H.

Hac, this. Hac nocte, this night. Hanc, this. Sumat hanc, let him take this.

Hactenus, hitherto, heretofore, up to the present day.

Harum, of these. Harum pilularum sumat tres, of these pills let him or her take three.

Haustus, a draught.

Hebdomada, a week.

Heri, yesterday. Ut heri, as yesterday.

Hesternus, of yesterday. Hesternæ nocte, last night.

Hirudo, a leech. Hirudines, leeches.

His, in these, to these. His adde, add to these.

- Hora, an hour. Horæ, of an hour. Horæ, (plural) hours.
 H. S. (horâ somni,) at the hour of rest.
 H. S. S. (horâ somni sumendus,) to be taken at bedtime. Hora decubitus, at the hour of going to rest, bedtime.
 Horâ vespertinâ, in the evening.
 Horæ unius spatio, in the space of one hour.
 Horæ $\frac{1}{4}$, horæ quadrante, quarter of an hour.
 Horis intermediis, at intermediate hours, when two medicines are to be taken. Horis intermediis, means that one is to be given exactly at midtime from the other: suppose a draught is ordered (to be taken every six hours,) and a powder horis intermediis, that is, every six hours intermediately, then a draught will be taken at six o'clock and at twelve, and a powder at three and at nine.
 Hujusmodi, of this sort, like these.
 H. P. N., Haustus purgans noster, a formula of purging draught made according to a practitioner's own private Pharmacopœia, and is prepared so as to keep a long time without spoiling, that we may not have the trouble of preparing it every time a draught is wanted. Mitt. H. P. N. 3ij ad ij Vices C. M. S. Mitte Haustus purgantis nostri uncias duas, ad duas Vices cras mane sumendus; send two ounces of our purging draught, to be taken to-morrow morning, at twice, that is half at first, and the remaining half in an hour if the first does not operate.

I.

- Idoneus, proper, appropriate.
 Idem, eadem, the same. Ejusdem, of the same, the genitive case of Idem.
 Imponatur, (sing.,) let there be put on—nantur (plural).
 Imprimis, first.
 In, in. In die, in a day.
 Indiès (an adverb,) every day, daily.
 Indicaverit, shows, indicates.
 Infus. panis tostus, toast bread water.
 Infusio, infusum, an infusion.
 Infunde, infundatur, infuse.
 Inter, between.
 Injectio, injection.
 Inquietudo, restlessness. Ungente inquietudine, if restless.
 Injiciatur, throw in, throw up. Injiciatur enema, let a clyster be administered.
 Injiciendus, injiciendum, to be administered.
 Instar (an adverb,) as big as. Sumat molem instar mucis moschatæ, the bigness of a nutmeg to be taken.
 Intermedius, intermediate.

Internis, the inner side.

J.

Jam, already. Jampridem, jamdudum, some time ago, heretofore.

Jugulum, the throat.

Jusculum, broth. Jusculum ovillum, mutton broth. Jus. bovinum, beef tea.

Juxta, near to.

L.

Lac, milk. Lactis, of milk. Lacte, in milk.

Lævigatus, levigated.

Lana, flannel. Lana nova, new flannel.

Languor, faintness, lowness. In languoribus, in the fainting fits, when low and faint.

Latus, the side. Lateris, of the side. Lateri, to the side. Latus dolens, the pained side. Lateri dolenti, to the pained side.

Latus, lata, latum (adjective,) broad.

Lectus, a bed. In lecto, in bed.

Liber, a book.

Libet (a verb impersonal,) it pleases. Ad libitum, just as you please.

Libra, a pound. Libris, libras, pounds.

Linteum, lint; also linen.

Liquesco, to liquefy, to melt. Donec liquescat, till it melts.

Liquidus, liquid. Sedes liquidæ, loose stools. In quovis liquido, in any liquid.

Londinensis, of London. Pharmacopœia Londinensis, the London Dispensatory.

Lumborum, of the loins.

M.

Magnus, magna, magnum, large. Magnum cochleare, a tablespoonful.

Major, greater, larger. Cochlearia duo majora, two tablespoonfuls.

Maximus, the greatest. Maximâ curâ, with the greatest care.

Maximè, chiefly.

Malleolus, the ankle. Malleolus internus, the inner ankle.

Manè, in the morning. Manè primo; valde mane, very early in the morning.

Manus, a hand. Manu calefacta, with a warm hand.

Massa, a mass. Massa pilularis, a mass fit for forming into pills.

Matutinus, in the morning or forenoon.

Mediocris, middle-sized. Pilulæ mediocris, middle-sized pills. Cochleare mediocre, a dessertspoonful, a papspoonful, or a child's spoonful.

Mediocris also means indifferent, as to quality.

Medius, middle. Media nocte, in the middle of the night.

Melior, melius, better.

Mica panis, crumb of bread.

Minatur, minaretur, threatens. Minante, threatening.

Minimus, very small. Cochleare minimum, a teaspoonful.

Minutum, * a minute.

Misce, mix. Bene misceatur, let it be well mixed.

Mitte, send.

Mittatur (singular,) let it be sent. Mittantur (plural,) let them be sent.

Mittatur sanguis, take blood away; *i. e.*, bleed the patient.

Mistura, mixtura, a mixture.

Mitigatio, mitigation, alleviation. Donec dolor is mitigatio sit, until the pain is easier.

Mitigatus, a um, mitigated, lessened.

Modicus, middle-sized.

Modus, a manner. Modo præscripto, in the manner directed.

Moles, a mass, a lump, a piece. Sumat molem instar nucis moschatæ, let him (or her) take the bigness or size of a nutmeg.

Mollis, molle, soft.

Molestus, troublesome. Molestor, to trouble, to be troublesome. Molestante dolore, when the pain is troublesome. Molestante tussi, when the cough is troublesome.

Mora, delay. Sine morâ, without delay.

Mos, moris, manner. More solito, in the usual manner; also, in the same manner as I am in the habit of prescribing it to other people.

Mortarium, a mortar. Mortario aheneo, in the brass mortar. Mortario marmoreo, in the marble mortar. Mort. vitreo, in the glass mortar.

N.

Narthecium, a gallipot.

Nates, the buttocks.

Ne, lest, also, do not; as ne tradas sine nummo, N. T. S. N., do not deliver the medicine without the money.

Neenon, also.

Niger, nigra, nigrum, black.

Ni, nisi, unless.

Nihil, nothing.

Nisus, an endeavor, an attempt, a straining, a motion, a straining to vomit, or go to stool.

Nimis, nimium, too much.

Nodulus, a little knot. Nodulo ligati, tied up in a piece of clean rag.

* The word minutum, for a minute, is very barbarous Latin; we believe there is no such word; but the right Latin for a minute, Sexagesima pars horæ, is as long and as tiresome to write as "Semivitreous oxide of lead," for the simple word "Litharge."—*Griffith*.

Nomen, nominis, a name. Signetur nomine proprio, S. N. P., write its common name upon the label.

Novem, nine.

Nonus, the ninth.

Novus, nova, novem, new.

Novissimè, very lately, the last of all.

Nocte, at night. Noctes, nights. Nocte maneque, night and morning.

Alternis noctibus, every second night.

Nuper, lately. Nuperrime, very lately.

Nucha, the nape of the neck. Nuchæ, to the nape.

N. M., Nux moschata, a nutmeg. Sumat magnitudinem nucis moschata, take the bigness of a nutmeg.

Numeri. Numbers.

1. or j. unus, una, unum, one.

unius, of one.

2. ij. duo, duæ, two.

duorum, of two

duobus, in two, to two.

3. iij. tres, tria, three.

tribus, in three, to three.

trium, of three.

ter, three times.

4 iv. quatuor, four.

quartus, a, um, fourth

quater, four times.

5. v. quinque, five.

quintus, fifth.

6. vj. sex, six.

sextus, sixth.

7. or vij. septem, seven.

septimus, seventh.

septimana, or

7 mana, a week.

8. viij. octo, eight.

octavus, eighth

9. ix. novem, nine.

nonus, ninth.

10. x. decem, ten.

decimus, tenth.

11. xj. undecim, eleven.

12. xij. duodecim, twelve.

20. xx. viginti, twenty.

24. xxiv. viginti quatuor, twenty-four.

O.

Obstante, hindering, preventing.

Occasio, occasion, opportunity.

Octo, eight.

Octavus, eighth. Octava quaque horâ, every eighth hour.

Olim, some time ago.

Olla, a pot, a gallipot.

Omnis, all. Omni mane, every morning. Omni horâ, every hour.

Omni bihoriô, every two hours. Omni nocte, every night. Omni $\frac{1}{4}$ horâ, Omni quadrante horæ, every quarter of an hour. Tere omnia, rub all together.

Omninò, quite, wholly, entirely.

Optimè, very well, as well as possible.

Optimus, ma, mum, best.

Opus, need, occasion. Si opus sit, or fuerit, if it be necessary.
 Ovillum juscum, mutton broth.
 Ovum, an egg. Vitell. ovi, the yelk of an egg. Overum, of eggs.

P.

Panis biscoctus, biscuit. Panis nauticus, sea biscuit. Panis tostus, toast bread. Infus. panis tostus, toast-bread water. Panis triticus, wheat bread.

Pannus, a rag. Pannus linteus, a linen rag. Pannus laneus, Pannus è lanâ, a piece of flannel.

Paroxysmus, a paroxysm, a fit, a convulsion fit.

Pars, a part. Partes, parts. Parti dolenti, to the pained part.

Partitus, parted. Partitus vicibus means, that you are not to give a medicine all at once, but divide the dose according to the directions most commonly previously given; for example, if a purging or emetic draught, half or a third, (as the case may be,) to be taken at first, and the other half or third at a certain distance of time, if the former quantity be not found sufficient to produce the desired effect.

Parvus, little. Cochleare parvum, a teaspoonful.

Parum, a little. Parumper, a little.

Pauculum, pauxillum, paululum, a little.

Pectus, the breast. Pectoris, of the breast.

Pediluvium, a bath for the feet.

Per, by, or through.

Pergo, to go on with. Pergat in usu medicinarum, continue the medicines as before.

Peractus, } completed, perfected, quite done, gone through with; as,
 Perfectus, } Peractâ operatione emetici, after the emetic has quite
 done operating.

Perfricetur, let it be rubbed. Perfricandus, to be rubbed.

Pensus, weighed. Accuratè pensi, weighed exactly.

Perpetuus, perpetual. Fiat perpetuum, keep it open, (when it refers to a blister).

Pluvialis, also pluviatilis aqua, rain water.

Pharmacopœia, the dispensatory.

Pollex, the thumb. Pollex pedis, the great toe.

Pomeridianus, postmeridianus, in the evening or afternoon, time of the day.

P. R. N., Pro re natâ, occasionally, according as circumstances may occur, according as the symptoms may require.

Poculum, a cup.

Pomum, an apple. Pomi, of an apple.

Pone, behind. Pondere, by weight.

Porro, moreover. Post, after. Postea, then, afterward.

P. M., Post meridiem, afternoon, in the afternoon, after twelve o'clock at noon.

Potus, drink, beverage of any kind.

Postulet, postulent, may require, demand.

Præcipue, especially.

Præparatus, prepared.

Præparo, to prepare. Præparentur, let them be prepared.

Primus, ma, mum, the first. Primò, first of all. Primo mane, very early in the morning.

Prior, prius, the former, the first.

Priusquam, before that.

Pro, for. Pro re natâ, P. R. N., occasionally, etc. Pro ratione, according to, or in proportion to; as pro ratione ætatis, according to the age of the patient.

Proprius, a um, proper. S. N. P., Signetur nomine proprio, mark it with its proper direction.

Pruritus, an itching. Pruriens, itching. Dolichos pruriens, cowhage.

Psora, the itch.

Pulvis, a powder. Pulveres, powders. Pulveribus, in powders.

Pulvis subtilissimus, the very finest powder.

Purificatus, a um, purified.

Pyxis, pyxidis, a pill-box, or lozenge-box.

Q.

Quadrans, quadrantis, quadrante, quarter. Omni quadrante horæ, every quarter of an hour.

Quacum, with which.

Quamprimum, as soon as possible, without the least delay.

Quartus, a um, the fourth.

Quâqua, every. Quâvis, (scm.) with any.

Quater, four times. Quatuor, four. Quarta pars, a fourth part.

—que, (at the end of any Latin word,) and.

Quem, quam, quod, which, (the accusative case).

Qui, quæ, quod, which, (the nominative case).

Quibus, to which, with which.

Quibusdam, to or with some. Cum guttis quibusdam, with a few drops.

Quilibet, quaelibet, quodlibet, gen. Cujuslibet, abl. Quolibet, any.

Quiescat, goes to rest, is easier.

Quinque, five. Quintus, a um, the fifth. Quinques, five times.

Quinquina, (cinchona,) Peruvian Bark.

Q. S.—q. s., Quantum sufficiat, as much as may be sufficient.

Quorum, quarum, of which. Quos, quas, which. Quocum, quacum, with which. Quovis, with any.

R.

Ratio, a reason, also a proportion. Pro ratione ætatis, according to the age of the patient. Pro ratione doloris, according to the urgency of the pain.

Raucedo, hoarseness.

Recipe, take. Recipe, (taken substantively,) a prescription.

Regio, a region, (an anatomical term for certain parts of the body); as, regio epigastrica, the epigastric region; regio lumborum, the region of the loins; appl. emplastr. regioni umbilicali, to the umbilical region, or parts in the neighborhood of the navel.

Redigo, to reduce. Redige, reduce. Redigetur, may be reduced. Redigatur, let it be reduced.

Redactus, a, um, reduced. In pulv. redact., reduced to powder.

Refrixerit—pl. int.—the subjunctive future of refrigescere, to cool.

Reliquus, a, um, the rest, the remaining part.

Remedium, a remedy. Continuandur remedia, go on with the same remedies as before.

Repetatur, let be repeated, repeat.

Repetendus, to be repeated.

Respondeo, responderit, shall have answered. Donec alvus ad sedes ij vel iij responderit, until two or three stools shall have been procured.

Ribes, currants. Gelatina ribesiorum, currant jelly.

Ruber, rubra, rubrum, red.

Rubus idæus, raspberry.

Retinendus, to be retained, or kept.

S.

S. V. R., spiritus vinosus rectificatus, rectified spirit of wine.

S. V., Ten, or tenuis, proof spirit.

Sæpe, often; sæpius, oftener; sæpissime, very often.

Saltem, at least.

Sanguis, blood,—inis, of blood. Sanguinis missura, blood-letting.

Saphena vena, the ankle vein.

Scapula, the shoulder blade. Inter scapulus, between the shoulders.

Scilicet, to wit, namely.

Serobiculus cordis, the pit of the stomach.

Secundus, a, um, (adjective,) second.

Secundum, (preposition,) according to.

S. A., Secundum artem, according to art; that is, you are to use your own ingenuity to do it in the most proper and scientific way.

Sed, but.

Sedes, a stool—plural, stools.

Semi, or semis, half. Semihora, half an hour. Semidrachma, half a drachm.

Sesqui, one and a half; as, sesquihora, an hour and a half. Sesquincia, or sescuncia, an ounce and a half. Sesquidrachma, a drachm and a half. Remember well to attend to the difference between these two words, for many young men, by not knowing that sesqui means one and a half, but confounding it with semi, have made bad mistakes.

Semper, always.

Semel, once.

Septem, seven.

Septimana, a week, seven days. Septimus, seventh.

Sequens, following.

Serum lactis, whey. In sero lactis vinoso, in wine whey.

Serum is also the watery part of the blood which separates from the red part, or crassamentum, on standing until cold.

Sex, six; Sextus, sixth.

Si, if. Sive, or, whether.

Signatura, a label or direction.

Signetur, let it be marked, directed, written upon.

S. N. P., Signetur nomine proprio, mark it with the name it is usually known by.

Simul, together; as, terantur simul, let them be rubbed together.

Simul ac, at the same time that.

Sine, without. Sine morâ, without delay.

Singultus, hiccup.

Singulus, a, um, each; in singulis, in each; singulorum, of each.

Sinister, tra, trum, the left. Auri sinistro, to the left ear.

Satis, thirst; si sitiât, if thirsty.

Solitus, accustomed.

Solus, alone; only.

Solutus, a, um, dissolved, also loosened; as, donec alvus soluta fuerit, until a stool is procured.

Solve, dissolve.

Somnus, sleep. Hora somni, at bed-time.

Spina, the spine, the backbone; also, a thorn.

Spissus, thick. Spissitudo, thickness of consistence.

Statim, directly, immediately.

Stent, let them stand. Stet, let it stand.

Sternutatorius pulvis, sneezing powder, snuff.

Stupa, tow.

Sub, subter, under. Sub finem coctionis, when the boiling is almost finished. Sub, prefixed to a word, implies diminution, or a process not completed; also, in many words has the same signification as the termination ish in English words, as subniger, blackish, not quite black. Subtepidus, lukewarm. For its meaning when applied to terms of chemistry, as subcarbonas, submurias, the pupil must study his chemical nomenclature.

- Subactus, a, um, subdued, dissolved.
 Subitus, a, um, Subitaneus, sudden. Subito, (adv.,) suddenly.
 Subtepidus, a little warm, lukewarm.
 Subige, dissolve it, make it unite. Subdue quicksilver with lard or balsam of sulphur.
 Subinde, frequently, now and then.
 Subtilis, subtle, reduced to fine powder. Pulv. subtilissimus, the very finest powder.
 Succ. pom. ferment., cider.
 Sumat, let him take. Sumatur, sumantur, let it be taken, take.
 Sudor, sweet.
 Superbibo, to drink after taking anything; as, chamomile tea or warm water after an emetic; or a cup of water, or any liquid medicine, to wash down a dose of any sort of pills.
 Superinfundo, to pour upon.
 Supra, above. Supradictus, above mentioned.
 Syncope, a fainting fit.

T.

- Tabellæ, tabulæ, lozenges.
 Talis, such. Sumat talem, let him take such a one as this.
 Talus, the ankle.
 Tam, so. Tamen, yet.
 Tactus, the touch.
 Tænia, the tapeworm,
 Tempus, temporis, time.
 Tempora, the temples. Temporibus, to the temples. Tempori dextro, to the right temple. Tempori sinistro, to the left temple.
 Temperies, temperamentum, temperament, degree of heat.
 Tenacitus, tenacity. Ad debitam tenacitatem, of a proper degree of tenacity or consistence.
 Teneo, to hold. Tenendus, to be held.
 Tenuis, weak, thin, small, slender.
 Tepefactus, warmed, made warm.
 Ter, three times, thrice. Ter quaterve, three or four times.
 Teres, teretis, round, taper; also, teres is a name for the long and round worm infesting the human body, qu. d. vermis teres.
 Tergum, the back. A tergo, behind.
 Tero, to rub. Tere, (imperative,) rub. Terendus, to be rubbed.
 Terantur, let them be rubbed.
 Tertius, tertia, tertium, the third.
 Testacea, the prepared powders made of oyster shells, egg shells, crabs' claws, etc.
 Thorax, the chest. Thoracis, of the chest.

Thus, frankincense.

Tinea capitis, scald head.

Torrefactus, toasted.

Tres, tria, three; tribus, in three, to three.

Triduum, three days.

Trituratio, a grinding. Trituratus, triturated, ground. Tritus, ground.

Trituratur exactissima minutes decem, Trit. ex. min. dec., T. E. M.

D., triturate exactly ten minutes. Trituratur intime commisceantur,

Trit. int. com., triturate intimately or accurately together.

T. O., Tinctura Opii, what is commonly called Laudanum.

T. O. C., Tintura Opii Camphorata, Camphorated Tincture of Opium, formerly called Paregoric Elixir. This tincture is now called, by the London College, in the late reform of the Pharmacopœia, edit. 1809, Tinctura Camphoræ Composita.

Trans, through. Cola trans chartam, filter through filtering paper.

Tussis, a cough. Tussi molestante, when the cough is troublesome.

U.

Ultimus, ultima, um, the last. Ultimó præscript, which was last prescribed.

Umbilicus, the navel.

Unà, (an adverb,) together.

Uncia, an ounce. Unciam cum semisse, an ounce and a half.

Undecim, eleven.

Unus, una, unum, one. Unius, of one. Uni, to one.

Urgente tussi, when the cough is troublesome.

Urgeo, to urge, to oppress, to be troublesome, or painful.

Usus, use. Pergat in usu remediorum, continue the use of the medicine as before.

Usque ad, up to, as far as.

Ut, as, that, so that; in the same manner as.

Utendus, to be used.

Utatur, let him make use of.

Uterque, utraque, utrumque, both. Utriusque, of both. Utrique, to both, to either, Admoveantur hirundines ij tempori utrique, apply two leeches to each temple.

Utriuslibet, of whichever of the two, or more, the patient likes best.

V.

Vaccinatio, the act of inoculating for the cowpock.

Variolæ vaccinæ, the cowpock.

Vaccinum lac, cow's milk.

Valde, very, very much.

Valeo, to avail; si non valeat, if it does not answer.

Variolæ, the small-pox.

Varicella, the chicken-pox.

Vas, a vessel. Vasis, of a vessel. Vase clauso, in a covered vessel.

Agitato vase, shaking the vessel.

Ve, vel, or; either: -ve is never at the beginning but the end of a word.

Vertebræ, the joints of the neck, back or loins; the vertebræ altogether form that column of bones which is called the spine.

Verus, true, real, genuine.

Vena, vein. Vena saphena, the ankle vein.

Venæsectio, bleeding. Fiat venæsectio, bleed him.

V. S. B., Venæsectio brachii, bleeding in the arm. Fiat venæsectio in venâ saphena, bleed the patient in the ankle vein,—or it may be understood, to bleed wherever you can find the best vein, at the top of the foot, to get blood from.

Vespere, in the evening.

Vespertinus, in the evening; as, horâ vi'a, vespertina, at six o'clock in the evening.

Vehiculum, a vehicle; that is, whatever liquid, or any other eatable or drinkable we take a medicine in, as barley water, whey, jelly, or panada, etc.

Viginti, twenty. Vicesimus, vigesimus, the twentieth.

Vinosus, vinarius, of wine. Cyathus vinarius, a wineglass.

Vices, turns; ad duas vices sumendus, to be taken at twice: that is, half to be taken at first, and the other half in some time after.

Vicibus partitis. See Partitus, in P.

Vice, in the room of. Vix, scarcely, hardly. Ut vix sentiatur, so that it can scarcely be perceivable.

Vitellus, the yelk of an egg.

V. O. S., Vitelli Ovi Solutum, dissolved in the yelk of an egg.

Vitrum, a glass. Vitreus, made of glass.

Vires, strength; si vires permittant, if the strength will bear it.

Vomitio, a vomiting. Vomitione urgente, when the vomiting is troublesome.

Vultus, the countenance.

COMPARISON OF THE DIFFERENT THERMOMETRIC SCALES.

The Thermometer always used in this country is that of Fahrenheit; it is also used in parts of Germany.

In this instrument the range between the freezing and boiling points of water is divided into 180°, and as the greatest possible degree of cold was supposed to be that produced by mixing snow and salt together, it was made the zero. Hence, the freezing point became 32°, and the boiling point 212°.

The Centigrade thermometer places the zero at the freezing point of water, and divides the range between the freezing and boiling points into 100°. This scale has long been used in Sweden, under the title of Celsius's thermometer, and is generally adopted on the Continent.

Reaumur's thermometer, which was formerly used in France, divides the space between the freezing and boiling points of water into 80°, and places the zero at the freezing point. It is now little employed.

Le Lisle's thermometer is used in Russia. The graduation begins at the boiling point, and increases toward the freezing point. The boiling point is marked 0°, and the freezing point 150°.

To convert the degrees of Centigrade into those of Fahrenheit, multiply by 9, divide by five, and add 32.

To convert the degrees of Centigrade into those of Reaumur, multiply by 4, and divide by 5.

To convert the degrees of Fahrenheit into those of Centigrade, deduct 32, multiply by 5, and divide by 9.

To convert the degrees of Fahrenheit into those of Reaumur, deduct 32, divide by 9, and multiply by 4.

To convert the degrees of Reaumur into those of Centigrade, multiply by 5, and divide by 4.

To convert the degrees of Reaumur into those of Fahrenheit, multiply by 9, divide by 4, and add 32.

TABLE OF PROPORTIONATE DOSES FOR DIFFERENT AGES.

GAUBIUS' TABLE.					Examples.
Under $\frac{1}{2}$ year,	1-15th	of a full dose.	or	4 grains.	
" 1 "	1-12th	" "	"	5 "	
" 2 "	1-8th	" "	"	$7\frac{1}{2}$ "	
" 3 "	1-6th	" "	"	10 "	
" 4 "	1-5th	" "	"	12 "	
" 7 "	1-3d	" "	"	20 "	
" 14 "	1-half	" "	"	30 "	
" 20 "	2-3ds	" "	"	40 "	
" 21 " the full dose				1 drachm.	
" 63 "	11-12ths	" "	"	55 grains.	
" 77 "	5-6ths	" "	"	50 "	
" 100 "	2-3ds	" "	"	40 "	

The following is the more simple rule of Dr. Young:

"For children under 12 years, the dose of most medicines must be diminished in the proportion of the age to the age increased by 12;

Thus, at 2 years, the dose will be 1-7th of that for adults, viz: $\frac{2}{2+12}$

$=\frac{1}{7}$. At 21 the full dose may be given."

To the above rule there are certain exceptions; thus castor oil requires to be given in larger proportionate doses, while opium and the narcotics generally should be administered in smaller proportionate quantities.

Sex, temperament, and idiosyncrasy have also a modifying effect upon the dose, and they should always be kept in view in the administration of medicines. Females usually require smaller doses than males; and persons of sanguine temperament bear depletory medicines better than the phlegmatic.

TABLES OF WEIGHTS AND MEASURES.

APOTHECARIES' WEIGHT. (U. S., L. E., D.)

Pounds.	Ounces.	Drachms.	Scruples.	Grains.
℔ 1	= 12	= 96	= 288	= 5760
	℥ 1	= 8	= 24	= 480
		ʒ 1	= 3	= 60
			ʒ 1	= gr. 20

AVOIRDUPOIS WEIGHT.

Pounds.	Ounces.	Drachms.	Troy Grains.
℔ 1	= 16	= 256	= 7000
	℥ 1	= 16	= 437.5
		ʒ 1	= 27.3437

RELATIVE VALUE OF TROY. (OR APOTHECARIES') AND AVOIRDUPOIS WEIGHTS.

Pound.	Pound.	Ounces.	Grains.
1 Troy,	= 0	13	72.5 (Avoirdupois)
1 Avoirdupois,	= 1	2	280 (Troy.)

APOTHECARIES' OR WINE MEASURE. (U. S., D.)

Gallon.	Pints.	Fluidounces.	Fluidrachms.	Minims.
Cong. 1	= 8	= 128	= 1024	= 61440
	0 1	= 16	= 128	= 7680
		℥ 1	= 8	= 480
			℥ 1	= ℥ 60

IMPERIAL MEASURE.

Gallon.	Pints.	Fluidounces.	Fluidrachms.	Minims.	Imp. Grains.
Cong. 1	= 8	= 160	= 1280	= 76800	= 70000
	0 1	= 20	= 160	= 9600	= 8750
		℥ 1	= 8	= 480	= 437.5
			℥ 1	= 60	= 54.7
				℥ 1	= 0.91

Drachm 1/2
Scruple 1/2
24

RELATIVE VALUE OF APOTHECARIES' AND IMPERIAL MEASURES.

*Apothecaries' Measure.**Imperial Measure.*

		Pints.	Fluidounces.	Fluidrachms.	Minims.
1 gallon	=	6	13	2	23
1 pint	=		16	5	18
1 fluidounce	=		1	0	20
1 fluidrachm	=			1	2½

*Imperial Measure.**Apothecaries' Measure.*

		Gallon.	Pints.	Fluidounces	Fluidrachms.	Minims.
1 gallon	=	1	1	9	5	8
1 pint	=		1	3	1	38
1 fluidounce	=				7	41
1 fluidrachm	=					58

RELATIVE VALUE OF APOTHECARIES' WEIGHTS AND MEASURES IN DISTILLED WATER AT 60° FAHRENHEIT.

		Pounds.	Ounces.	Drachms.	Scruples.	Grains.
1 gallon	=	10	1	4	0	8.88
1 pint	=	1	3	1	1	11.11
1 fluidounce	=	0	0	7	1	15.69
1 fluidrachm	=	0	0	0	2	16.96
1 minim	=	0	0	0	0	.9493

FRENCH DECIMAL WEIGHTS AND MEASURES REDUCED TO ENGLISH.

MEASURES AND WEIGHTS.

English Troy Grains.

Milligramme	=	.0154				
Centigramme	=	.1543				
Decigramme	=	1.5434				
Gramme	=	15.4340				
Decagramme	=	154.3402	=	0	0	2 34.3
Hectogramme	=	1543.4023	=	0	3	1 43.4
Killogramme	=	15434.0234	=	2	8	1 14
Myriagramme	=	154340.2344	=	26	9	4 20

MEASURES OF LENGTH.

The metre being at 32°, and the foot at 62°.

	English Inches.						
Millimetre	=	.03937					
Centimetre	=	.39371					
Decimetre	=	3.93710	Miles.	Fur.	Yds.	Ft.	Inches.
Metre	=	39.37100	= 0	= 0	1	0	3.371
Decametre	=	393.71000	= 0	= 0	10	2	9.710
Hectometre	=	3937.10000	= 0	= 0	109	1	1.100
Kilometre	=	39371.00000	= 0	= 4	213	1	11.000
Myriametre	=	393710.00000	= 6	1	156	1	2.000

MEASURES OF CAPACITY.

	English Cubic Inches.		Apothecaries' Measure.
Millitre	=	.061028	= 16.2318 minims.
Centilitre	=	.610280	= 2.7053 fluidrachms.
Decilitre	=	6.102800	= 3.3816 fluidounces.
Litre	=	61.028000	= 2.1135 pints.
Decalitre	=	610.280000	= 2.6419 gallons.
Hectolitre	=	6102.800000	
Kilolitre	=	61028.000000	
Myrialitre	=	610280.000000	

APPROXIMATE MEASUREMENTS.

A teacup	is estimated to contain	f3iv, or a gill.
A wineglass	“ “	f3ij.
A tablespoon (cochlear magnum)	“	f3ss.
A teaspoon (cochlear parvum)	“	f3j.

TABLE EXHIBITING THE NUMBER OF DROPS OF DIFFERENT LIQUIDS EQUIVALENT TO A FLUIDRACHM.

Liquid medicines, in small quantities, are frequently estimated by *drops*, which are often incorrectly considered equivalent to a *minim*, or the sixtieth part of a fluidrachm. The drop of water and of watery fluids is, on an average, about this size; but this is by no means the case with all liquids. Even in the same liquid the size of the drop varies, according to the shape of the vessel, and of its mouth, from which it is dropped. The following table was compiled by Mr. E. Durand, of Philadelphia.

	Drops.		Drops.
Acid, acetic (crystallizable).....	120	Acid, sulphuric, (aromatic).....	120
Acid, hydrocyanic (medicinal).....	45	Acid, sulphuric, diluted, (1 to 7)...	51
Acid, muriatic,.....	54	Alcohol (rectified spirit).....	138
Acid, nitric.....	84	Alcohol, diluted (proof spirit).....	120
Acid, nitric, diluted, (1 to 7).....	51	Arsenite of potassa, solution of,....	57
Acid, sulphuric.....	90	Chloroform,.....	250 to 300

	Drops.		Drops.
Ether, sulphuric.....	150	Vinegar of squill,.....	78
Oil of aniseed, cinnamon, cloves, pep- permint, sweet almonds, and olives	120	Water, distilled,.....	45
Tincture of assafoetida, foxglove, guaiac., and opium.....	120	Water of ammonia (strong).....	54
Tincture of chloride of iron.....	132	Water of ammonia (weak).....	45
Vinegar, distilled.....	78	Wine (Teneriffe).....	78
Vinegar of colchicum.....	78	Wine, antimonial.....	72
Vinegar of opium (black drop).....	78	Wine of colchicum.....	75
		Wine of opium.....	78

A TABLE EXHIBITING THE COMPOSITION OF THE PRINCIPAL NATURAL MINERAL
WATERS OF EUROPE AND THE UNITED STATES.

1. CARBONATED WATERS, are such as contain an excess of carbonic acid, which gives them a sparkling appearance and the power of reddening litmus paper. These waters frequently contain the carbonate of iron, lime and magnesia, which are held in solution by the excess of carbonic acid, and which are deposited when the water is boiled, or exposed for some time to the air.

SELTZER.—(*Germany.*)

	In a wine pint.
Carbonic acid, cubic inches	17
Solid contents.	
Carbonate of Soda, grains	4
Carbonate of Magnesia,.....	5
Carbonate of Lime,.....	8
Chloride of Sodium,.....	17
Total,....	29

[BERGMANN.]

—
PYRMONT.—(*Germany.*)

Temperature, 55° F.

	In a wine pint.
Carbonic Acid, cubic inches	26
Solid contents.	
Carbonate of Magnesia, grains	10.0
Carbonate of Lime,.....	4.5
Sulphate of Magnesia,.....	5.5
Sulphate of Lime,.....	8.5
Chloride of Sodium,.....	1.5
Oxide of Iron.....	0.6
Total,....	30.6

[BERGMANN.]

—
SPA.—(*Belgium.*)

Temperature 50° F.

	In a wine pint.
Carbonic Acid, cubic inches.	13

Solid contents.	In a wine pint.
Carbonate of Soda, grains	1.5
Carbonate of Magnesia,.....	4.5
Carbonate of Lime,.....	1.5
Chloride of Sodium,.....	0.2
Oxide of Iron,.....	0.6
Total,.....	8.3

[BERGMANN.]

MONT D'OR.—(*France.*)

Four springs, the temperature of which respectively, is 107°, 109°, 113°, and 52° F.

Madeleine Spring.

	In a Parisian pint.
Carbonic Acid,.....	grains 4.64
Carbonate of Soda,.....	6.75
Sulphate of Soda,.....	2.04
Muriate of Soda,.....	5.18
Alumina,.....	2.21
Carbonate of Lime,.....	4.14
Carbonate of Magnesia,.....	1.36
Oxide of Iron,.....	0.40
Total,....	26.72

—
VICHY.—(*France.*)

The temperature of the different springs, varies from 72° to 114° F. They all contain carbonic acid, carbonates of lime, magnesia, and soda, sulphate of soda and muriate of soda.

SWEET SPRINGS.—(*Virginia.*)

Temperature, 73° F.

In a quart.

Carbonic Acid,	}	grs. 12 to 15
Sulphate of Magnesia,		
Muriate of Soda,		
Muriate of Lime,		
Sulphate of Lime,	}	grs. 12 to 15

Carbonate of Magnesia,	}	grs. 18 to 24	
Carbonate of Lime,			
Silicious Earth,			
Iron,.....	grains $\frac{1}{2}$ to 1		
	[ROUELLE.]		

II. SULPHURETED WATERS, or such as contain sulphureted hydrogen, are distinguished by their peculiar fetid smell, and by their yielding brown precipitates with the salts of lead and silver.

AIX-LA-CHAPELLE.—(*Germany.*)

Temperature, 110° to 143° F.

In a wine pint.

Sulphureted Hydrogen, cu. in.,	5.5
Solid contents.	
Carbonate of Soda,	grains 12
Carbonate of Lime,.....	4.75
Chloride of Sodium,.....	5

Total,.....2175

[BERGMANN.]

HARROWGATE, OLD WELL.—(*Eng.*)

Gaseous contents. In a wine gallon.

Sulphureted Hydrogen, cu. in.	14
Carbonic Acid,.....	4.25
Nitrogen,.....	8
Carbureted Hydrogen,.....	4.15
Total,....	30.40

Solid contents.

Chloride of Sodium,	grains 752
Chloride of Calcium,.....	65.75
Chloride of Magnesium,.....	29.3
Bicarbonate of Soda,.....	12.8

Total,....859.75

WHITE SULPHUR.—(*Virginia.*)

Temperature, 62° F.

Gaseous contents. In a wine gallon.

Sulphureted Hydrogen, cu. in.	2.5
Carbonic Acid,.....	2
Oxygen,.....	1.448
Nitrogen,.....	3.552

Total,.... 9.5

Solid contents.

Sulphate of Magnesia,	grains 5.588
Sulphate of Lime,.....	7.744

Solid contents.

In a pint.

Carbonate of Lime,.....	1.150
Chloride of Calcium,.....	0.204
Chloride of Sodium,.....	0.180
Oxide of Iron,.....	a trace.
Loss,.....	0.410

Total,.... 15.276

[PROF. W. B. ROGERS.]

RED SULPHUR.—(*Virginia*)

Temperature, 54° F.

Gaseous contents. In an imperial gallon.

Sulphureted Hydrogen, cu. in.	4.54
Carbonic Acid,.....	8.75
Nitrogen,.....	4.25

Solid contents.

In 32 cubic inches.

Sulphate of Soda,	}	grains 1.25
Sulphate of Lime,		
Sulphate of Magnesia,		
Carbonate of Lime,		
Muriate of Soda,		

[PROF. W. B. ROGERS.]

SALT SULPHUR.—(*Virginia.*)

Temperature 49° to 56° F.

Gaseous contents. In 100 cu. in.

Sulph. Hydrogen, cu. in.	1.10 to 1.50
Nitrogen,.....	2.05
Oxygen,.....	0.27
Carbonic Acid,.....	5.65

Solid contents.

Sulphate of Lime,	grains 36.755
Sulphate of Magnesia,.....	7.883
Sulphate of Soda,.....	9.682
Carbonate of Lime,.....	4.445
Carbonate of Magnesia,.....	1.434
Chloride of Magnesium,.....	0.116
Chloride of Sodium,.....	0.683
Chloride of Calcium,.....	0.025

Solid contents.

Peroxide of Iron, from Protosulph.,	0.042
An azotized organic matter, blended with sulphur, about,.....	4
Earthy Phosphates,.....	a trace.
Iodine,.....	"

[PROF. W. B. ROGERS.]

WARM SPRINGS.—(*Virginia.*)

Temperature, 98° F.

Gaseous contents.	In a gallon.
Sulphureted Hydrogen,	cu. in. 0.25
Nitrogen,.....	3.25
Carbonic Acid,.....	1.00
Solid contents.	
Muriate of Lime,.....	grains 3.968
Sulphate of Magnesia,.....	9.984
Carbonate of Lime,.....	4.288
Sulphate of Lime,.....	5.466
Soda,.....	a trace.

Total,.... 23.706

[PROF. W. B. ROGERS.]

BLUE SULPHUR.—(*Virginia.*)

Solid contents. (Amount not given.)

Sulphate of Lime,	
Sulphate of Magnesia,	
Sulphate of Soda,	
Carbonate of Lime,	
Carbonate of Magnesia,	
Chloride of Magnesium,	
Chloride of Sodium,	
Chloride of Calcium,	
Hydrosulphate of Soda and Magnesia,	
Protosulphate of Iron,	
Iodine,	
Sulphur,	
Organic Matters.	

Gaseous contents. (Amount not given.)

Sulphureted Hydrogen,
Carbonic Acid,
Oxygen,
Nitrogen.

[PROF. W. B. ROGERS.]

SHARON SPRINGS.—(*New York.*)

White Sulphur.

Temperature, 48° F.

	In a wine gallon
Sulphureted Hydrogen,	cu. in. 20.5
Solid contents.	
Bicarbonate of Magnesia,	grs. 24.0
Sulphate of Magnesia,.....	34.0
Sulphate of Lime,.....	85.4
Hydrosulphate of Magnesia and Lime,.....	3.0
Chloride of Sodium and Magnesium,.....	2.7

Total,..... 1.491

Magnesia Springs.

Temperature, 48° F.

	In a wine gallon.
Sulphureted Hydrogen,	cu. in. 3.3
Solid contents.	
Bicarbonate of Magnesia,	grs. 30.5
Sulphate of Magnesia,.....	22.7
Sulphate of Lime,.....	76.0
Hydrosulphate of Magnesia and Lime,.....	0.5
Chloride of Sodium and Magnesium,.....	3.0

Total,.... 132.7

III. CHALYBEATE WATERS are characterized by their inky taste, and by striking a blue-black color with an infusion of galls, and a blue color with ferrocyanuret of potassium. The iron is generally in the state of carbonate of the protoxide, held in solution in the water by excess of carbonic acid. By standing or boiling, the carbonic acid is driven off, and the protoxide, by absorbing oxygen, is precipitated as a hydrated sesquioxide, of an ochreous color.

TUNBRIDGE WELLS.—(*England.*)

Solid contents.	In a wine gallon.
Chloride of Sodium,.....	grains 2.46
Chloride of Calcium,.....	0.39

Solid contents.	In a wine gallon.
Chloride of Magnesium,.....	0.29
Sulphate of Lime,.....	1.41
Carbonate of Lime,.....	0.27

Solid contents.	In a wine gallon.
Oxide of Iron,.....	2.22
Manganese, Silica, etc.,.....	0.44
Loss,.....	0.13
Total,....	7.61
	[SCUDAMORE.]

BRIGHTON.—(*England.*)

	In a wine pint.
Carbonic Acid,.....	cub. in. 2.5
Solid contents.	
Sulphate of Iron,.....	grs. 1.80
Sulphate of Lime,.....	4.09
Chloride of Sodium,.....	1.53
Chloride of Magnesium,.....	0.75
Silica,.....	0.14
Loss,.....	0.19
Total,.....	8.5
	[MARCET.]

CHELTENHAM.—(*England.*)

Chalybeate Spring.

	In a wine pint.
Carbonic Acid,.....	cub. in. 2.5
Solid contents.	
Carbonate of Soda,.....	grs. 0.5
Sulphate of Soda,.....	22.7
Sulphate of Magnesia,.....	6
Sulphate of Lime,.....	2.5
Chloride of Sodium,.....	41.3
Oxide of Iron,.....	0.8
Total,.....	73.8
	[BRANDE & PARKES.]

BEDFORD.—(*Pennsylvania.*)

Anderson's Spring.

Temperature, 55° F.

	In a wine gallon.
Carbonic Acid,.....	cub. in. 74
Solid contents.	
Sulphate of Magnesia,.....	grs. 80
Sulphate of Lime,.....	14.5
Chloride of Sodium,.....	10
Chloride of Calcium,.....	3
Carbonate of Lime,.....	8
Carbonate of Iron,.....	5
Total,....	120.5
	[DR. CHURCH.]

Or according to J. Cheston Morris.—
One pint of the water evaporated at 240°
F., yields of solid residuum:—

Carbonate of Lime,.....	2.120
Sulphate of Lime,.....	11.274
Sulphate of Magnesia,.....	3.974
Sulphates of Alumina and Iron,.....	1.280
Sulphate of Soda,.....	3.092
Chloride of Sodium,.....	0.343
Free Sulphuric acid,.....	0.128
Organic Matter and Silica,.....	a trace
Total,....	22.201

SCHOOLEY'S MOUNTAIN.—(*N. J.*)

Temperature, 50° F.

Solid contents.	In a wine pint.
Muriate of Soda,.....	grs. 0.43
Muriate of Lime,.....	2.40
Muriate of Magnesia,.....	0.50
Carbonate of Lime,.....	7.99
Sulphate of Lime,.....	0.65
Carbonate of Magnesia,.....	0.40
Silica,.....	0.80
Carbonate of Iron,.....	2.00
Extractive,.....	0.92
Loss,.....	0.41
Total,....	16.50

BALSTON SPA.—(*New York.*)

Sans Souci Spring.

Temperature, 50° F.

Solid contents.	In a wine Gallon.
Chloride of Sodium,.....	grs., 143.733
Bicarbonate of Soda,.....	12.66
Bicarbonate of Magnesia,.....	39.10
Carbonate of Lime,.....	43.407
Carbonate of Iron,.....	5.95
Iodide of Sodium,.....	1.30
Silica,.....	1
Total,....	247.15
	[STEEL.]

IV. SALINE WATERS comprise those which contain a sufficient amount of neutral salts to give them a marked, and generally a purgative

operation. The salts most usually present are the sulphates and carbonates of lime, magnesia, and soda, and the chlorides of calcium, sodium, and magnesium. Iodine and bromine have been found in a few saline springs; and some of them contain carbonic acid and iron, which might entitle them to be classified, respectively, with the carbonated or chalybeate waters.

PLOMBIERES.—(*France.*)

Temperature, 90° to 144° F.

Solid contents.	In a pint.
Carbonate of Soda,..... grains	2.16
Sulphate of Soda,.....	2.33
Chloride of Sodium,.....	1.25
Carbonate of Lime,.....	0.50
Silica,.....	1.33
Animal Matter,.....	1.50
Total,.....	9.07

[VAUQUELIN.]

CARLSBAD.—(*Bohemia.*)

Temperature, 165° F.

Solid contents.	In a wine pint.
Carbonate of Lime,..... grains	4.15
Sulphate of Soda,.....	41.51
Chloride of Sodium,.....	5.33
Carbonate of Soda,.....	11.76
Lithia (Berzelius),.....	a trace

[BERGMANN.]

SEIDLITZ.—(*Bohemia.*)

Solid contents. In a wine pint.

Sulphate of Magnesia,.. grains	180
Sulphate of Lime,.....	5
Carbonate of Magnesia,.....	2.5
Carbonate of Lime,.....	0.8
Chloride of Magnesium,.....	4.5

Total,.... 192.8

[BERGMANN.]

CHELTENHAM.—(*England.*)

Saline Spring.

Solid contents.	In a wine pint.
Sulphate of Soda,..... grains	15
Sulphate of Magnesia,.....	11
Sulphate of Lime,.....	4.5
Chloride of Sodium,.....	50

Total,.... 80.5

[PARKES & BRANDE.]

BATH.—(*England.*)

Temperature, 100° to 106° F.

Solid contents.	In a wine pint.
Carbonic Acid,..... cub. in.	1.2
Carbonate of Lime,..... grs.	0.8
Sulphate of Soda,.....	1.4
Sulphate of Lime,.....	9.3
Chloride of Sodium,.....	3.4
Silica,.....	0.2
Oxide of Iron,.....	a trace.

Total,.. 15.1

[PHILLIPS.]

HOT SPRINGS.—(*Virginia.*)

Temperature 98° to 106° F.

Solid contents (the quantity not given.)

Carbonate of Lime,	
Carbonate of Magnesia,	
Carbonate of Iron,	
Sulphate of Lime,	
Sulphate of Soda,	
Sulphate of Magnesia,	
Free Nitrogen.	

[PROF. W. B. ROGERS.]

SARATOGA.—(*New York.*)

Congress Spring.

Gaseous contents	In a wine gallon.
Carbonic Acid,..... cub. in.	311
Atmospheric Air,.....	7
Total,....	318

Solid contents.

Chloride of Sodium,..... grs.	385
Iodide of Sodium,.....	3.5
Bicarbonate of Soda,.....	8.982
Bicarbonate of Magnesia,.....	95.788
Carbonate of Lime,.....	98.098
Carbonate of Iron,.....	5.075
Silica,.....	1.5
Bromide of Potassium,.....	a trace.

Total,.... 597.943

[STEELE.]

SARATOGA.—(*Iodine Spring.*)

Gaseous contents.	In a wine gallon.
Carbonic Acid,.....	cub. in. 336
Atmospheric Air,.....	4
Total,.....	340

Solid contents.

Chloride of Sodium,.....	grs. 187
Carbonate of Magnesia,.....	75
Carbonate of Lime,.....	26
Carbonate of Soda,.....	2
Carbonate of Iron,.....	1
Iodine,.....	3.5
Total,.....	294.5

[PROF. EMMONS.]

SARATOGA.—(*Pavilion Spring.*)

Gaseous contents.	In a wine gallon.
Carbonic Acid,.....	cub. in. 359.05
Atmospheric Air,.....	5.03
Total,.....	364.08

Solid contents.

Chloride of Sodium,.....	grs. 187.68
Carbonate of Soda,.....	4.92
Carbonate of Lime,.....	52.84
Carbonate of Magnesia,.....	56.92
Carbonate of Iron,.....	3.51
Sulphate of Soda,.....	1.48
Iodide of Sodium,.....	2.59
Alumina,.....	0.42
Silica,.....	1.16
Phosphate of Lime,.....	0.19
Bromide of Potassium,.....	a trace.
Total,.....	311.71

[DR. J. R. CHILTON.]

SARATOGA.—(*Union Spring.*)

Gaseous contents.	In a wine gallon.
Carbonic Acid,.....	cub. in. 314.16
Atmospheric Air,.....	4.62
Total,.....	318.78

Solid contents.

Chloride of Sodium,.....	grs. 243.620
Carbonate of Magnesia,.....	84.265
Carbonate of Lime,.....	41.600
Carbonate of Soda,.....	12.800
Carbonate of Iron,.....	5.452
Iodide of Sodium, or Iodine,...	3.600
Silica and Alumina,.....	1.570
Bromide of Potassium,.....	a trace.

Total,..... 392.907

[DR. J. R. CHILTON.]

SEA WATER.—(*English Channel.*)

	In 1000 grains.
Water,.....	grs. 964.744
Chloride of Sodium,.....	27.059
Chloride of Potassium,.....	0.765
Chloride of Magnesium,.....	3.667
Bromide of Magnesium,.....	0.029
Sulphate of Magnesia,.....	2.296
Sulphate of Lime,.....	1.407
Carbonate of Lime,.....	0.033

Total,..... 1000.000

[SCHWEITZER.]

V. ACIDULOUS WATERS. This division of Mineral Waters is intended to comprise such as contain a *free* acid, other than carbonic acid. They are, comparatively, of rare occurrence. The following is an analysis of *Sulphuric Acid Springs*, lately brought into notice :

OAK ORCHARD SPRINGS.—(*N. Y.*)

	In a gallon.
Free Sulphuric Acid,.....	grs. 82.96
Sulphate of Lime,.....	39.60
Protosulphate of Iron,.....	14.32
Sulphate of Alumina,.....	9.68
Sulphate of Magnesia,.....	8.28

	In a gallon.
Silica,.....	1.04
Organic Extractive Matters,.....	3.28

Total,..... 16.032

DR. J. R. CHILTON.

The ALUM SPRING of Virginia, is also stated to contain free sulphuric acid.

VI. SILICEOUS WATERS. These Mineral Waters are extremely rare; and in those hitherto discovered, the silica appears to have been

dissolved by means of Soda. The most remarkable of these are the boiling springs of Geyser, in Iceland, of which the following is the analysis, as given by Black. (*Edin. Phil. Trans.* iii. 95.)

Solid contents.	In a gallon.
Soda,.....	grs. 5.56
Alumina,.....	2.80
Silica,.....	31.50
Muriate of Soda,.....	14.42
Sulphate of Soda,.....	8.57
Total,....	62.85

In addition to the above, the following qualitative analyses have been recently made :

SULPHUR SPRING. (*Nashville, Tenn.*)

Sulphureted Hydrogen,
Carbonic Acid,
Hydrochloric Acid,
Sulphuric Acid,
Magnesia as a Sulphate,
Soda, as a Hydrochlorate.

[PROF. BOWEN.]

SAM'S CREEK SPRING.—(*Davidson County.*)

Sulphureted Hydrogen,
Carbonic Acid,
Sulphate of Lime,
Hydrochlorate of Soda.

[PROF. TROOST.]

TYREE'S SPRINGS.—(*Davidson Co.*)

Sulphureted Hydrogen,
Carbonic Acid,
Sulphate of Lime,
Sulphate of Magnesia,
Carbonate of Lime,
Hydrochlorate of Soda.

[PROF. TROOST.]

SHELBY CHALYBEATE SPRING.

(*Nashville.*)

Temperature of spring, 61°, while the air was 90°

Carbonic Acid, free,
Carbonate of Iron,
Carbonate of Magnesia,
Carbonate of Lime,
Chloride of Sodium,
Sulphate of Magnesia.

[RICHARD O. CURREY.]

BAYLEY'S SPRING.—(*Florence, Ala.*)

Carbonic Acid, 324 cubic inches in a gallon,
Carbonate of Magnesia,
Carbonate of Soda,
Carbonate of Iron,
Carbonate of Potassa, according to Prof. Tuomey,
Iodine, at least 3 grains to the gallon,
Chloride of Sodium.

[RICHARD O. CURREY.]

These last springs, at Florence, are noted for their efficacy in scrofulous and dropsical diseases.

TABLES OF SPECIFIC GRAVITIES, ETC.

*Relation between Specific Gravities, and Degrees of Baumé's Hydrometer
for Liquids heavier than Water.*

Sp. Gr.	Baumé.	Sp. Gr.	Baumé.	Sp. Gr.	Baumé.	Sp. Gr.	Baumé.
1.000	= 0	1.152	= 19	1.359	= 38	1.656	= 57
1.007	1	1.161	20	1.372	39	1.676	58
1.014	2	1.171	21	1.384	40	1.695	59
1.022	3	1.180	22	1.398	41	1.714	60
1.029	4	1.190	23	1.412	42	1.736	61
1.036	5	1.199	24	1.426	43	1.758	62
1.044	6	1.210	25	1.440	44	1.779	63
1.052	7	1.221	26	1.454	45	1.801	64
1.060	8	1.231	27	1.470	46	1.823	65
1.067	9	1.242	28	1.485	47	1.847	66
1.075	10	1.252	29	1.501	48	1.872	67
1.083	11	1.264	30	1.526	49	1.897	68
1.091	12	1.275	31	1.532	50	1.921	69
1.100	13	1.286	32	1.549	51	1.946	70
1.108	14	1.298	33	1.566	52	1.974	71
1.116	15	1.309	34	1.583	53	2.002	72
1.125	16	1.321	35	1.601	54	2.031	73
1.134	17	1.334	36	1.618	55	2.059	74
1.143	18	1.346	37	1.637	56	2.087	75

*Relation between Specific Gravities, and Degrees of Baumé's Hydrometer
for Liquids lighter than Water.*

Sp. Gr.	Baumé.	Sp. Gr.	Baumé.	Sp. Gr.	Baumé.	Sp. Gr.	Baumé.
1.000	= 10	0.918	= 23	0.849	= 36	0.789	= 49
0.993	11	0.913	24	0.844	37	0.785	50
0.986	12	0.907	25	0.839	38	0.781	51
0.980	13	0.901	26	0.834	39	0.777	52
0.973	14	0.896	27	0.830	40	0.773	53
0.967	15	0.890	28	0.825	41	0.768	54
0.960	16	0.885	29	0.820	42	0.764	55
0.954	17	0.880	30	0.816	43	0.760	56
0.948	18	0.874	31	0.811	44	0.757	57
0.942	19	0.869	32	0.807	45	0.753	58
0.936	20	0.864	33	0.802	46	0.749	59
0.930	21	0.859	34	0.798	47	0.745	60
0.924	22	0.854	35	0.794	48		

HYDROMETRICAL EQUIVALENTS.

Sp. Gr. at 60° Fah.	100 parts contain of Alcohol Sp. Gr. 796. By Weight.		1000 parts contain of Standard Alc. Sp. Gr. 825.	Sikes.	Baumé.	Cartier.	Per Cent. of Alcohol. Sp. Gr. 796 by volume. Gay Lussac.
796	100	0			46.5	43.48	100
797	99.5	.5					99.75
798	99	1			46	43.06	99.50
799	98.67	1.33					99.25
800	98.33	1.67					99
801	98	2					98.75
802	97.67	2.33			45	42.14	98.50
803	97.33	2.67				42	98.28
804	97	3					98.15
805	96.67	3.33					98
806	96.33	3.67					97.80
806.5	96.17	3.83			44	41.21	97.70
807	96	4					97.60
808	95.5	4.5				41	97.40
809	95	5					97.29
809.5	94.89	5.10					97.10
810	94.67	5.33					97
811	94.33	5.67			43	40.34	96.75
812	94	6					96.50
813	93.67	6.33				40	96.25
814	93.33	6.67					96
815	93	7					95.75
816	92.5	7.5			42	39.40	95.50
817	92	8					95.25
818	91.67	8.33					95
818.6	91.5	8.5				39	94.90
819	91.33	8.67					94.75
820	91	9					94.50
821	90.5	9.5			41	38.46	94.25
822	90	10					94
823	89.67	10.33				38	93.75
824	89.33	10.67					93.50
825	89	11	1000	63 O. P.	40	37.55	93.25
826	88.5	11.5	993	62			93
827	88	12	988.5	61.5		37	92.6
828	87.67	12.33	984	61	39.5		92.3
829	87.33	12.67	979.5	60.5	39	36.63	92
830	87	13	975	60			91.7
831	86.5	13.5	970.5	59.5	38.5	36.17	91.35
832	86	14	966	59		36	91
833	85.67	14.33	961.5	58.3			90.65
834	85.33	14.67	957	58	38	35.72	90.3
835	85	15	953	57.5			90
836	84.67	15.33	949	57	37.5	35.26	89.7
837	84.33	15.67	944.5	56.5			89.35
837.6	84.25	15.75	942.5	56.3		35	89.20

Sp. Gr. at 60° Fah.	100 parts contain of Alcohol Sp. Gr. 796. By Weight.		1000 parts contain of Standard Alc. Sp. Gr. 825.	Sikes.	Baumé.	Cartier.	Per Cent. of Alcohol. Sp. Gr. 796 by volume. Gay Lussac.
	Alcohol	Water.					
838	84	16	940	56 O. P.			89
839	83.5	16.5	936	55.5	37	34.80	88.75
840	83	17	932	55			88.5
841	82.67	17.33	928	54.5	36.5		88.25
842	82.33	17.67	924	54		34.94	88
843	82	18	920	53.5		34	87.65
844	81.67	18.33	916	53	36	33.88	87.3
845	81.33	18.67	912	52.5			87
846	81	19	908	52			86.7
847	80.5	19.5	903	51	36.5	33.42	86.35
848	80	20	898	50			86
849	79.67	20.33	893	49.5			85.65
850	79.33	20.67	888	49	35	33	85.3
851	79	21	883	48.5			85
852	78.5	21.5	878	48	34.5	32.43	84.7
853	78	22	873	47.5			84.35
854	77.5	22.5	868	47			84
855	77	23	862.5	46.5	34	32.04	83.65
856	76.5	23.5	857	46			83.3
857	76	24	853	45.5	33.5	31.58	83
858	75.67	24.33	849	45			82.7
859	75.33	24.67	844.5	45			82.35
860	75	25	840	45	33	31.13	82
861	74.67	25.33	836.5	44.5		31	81.7
862	74.33	25.67	833	44			81.3
862.5	74.16	25.84	830.5	43.75	32.5	30.76	81
863	74	26	828	43.5			80.8
864	73.5	26.5	823	43			80.3
865	73	27	818	42.5	32	30.21	79.95
866	72.5	27.5	813	42			79.6
867	72	28	810	41			79.3
867.5	71.83	28.17	808.5	40.5	31.5	29.78	79.15
868	71.67	28.33	807	40			79
869	71.33	28.67	802.5	39.5			78.65
870	71	29	798	39	31	29.29	78.3
871	70.5	29.5	792.5	38.5			78
872	70	30	787	38		29	77.7
873	69.5	30.5	781.5	37	30.5	28.83	77.35
874	69	31	776	36			77
875	68.67	31.33	772	35			76.5
876	68.33	31.67	768	34	30	28.38	76
877	68	32	762.5	33			75.65
877.5	67.75	32.25	759.25	32.5		28	75.5
878	67.5	32.5	757	32			75.3
878.5	67.25	32.75	753.75	31.5	29.5	27.91	75
879	67	33	751.5	31			74.8
880	66.5	33.5	746	30			74.3
881	66	34	742	29.5	29	27.44	74

Sp. Gr. at 60° Fah.	100 parts contain of		1000 parts contain of Standard Alc. Sp. Gr. 825.	Sikes.	Baumé.	Cartier.	Per Cent. of Alcohol. Sp. Gr. 796 by volume. Gay Lussac.
	Alcohol Sp. Gr. 796. By Weight.	Water.					
882	65.5	34.5	738	29 O. P.			73.7
883	65	35	733.5	28.5		27	73.35
883.5	64.83	35.17	731.25	28.25	28.5	26.99	73.17
884	64.67	35.33	729	28			73
885	64.33	35.67	724	27.5			72.5
886	64	36	719	27	28	26.53	72
887	63.67	36.33	714	26			71.5
888	63.33	36.67	709	25			71
889	63	37	704	24.5	27.5	26.07	70.65
890	62.5	37.5	699	24			70.3
891	62	38	694	23			69.8
892	61.5	38.5	689	22	27	25.61	69.3
893	61	39	644.5	21			69
894	60.67	39.33	680	20			68.7
895	60.33	39.67	675.5	19.5			68.35
895.5	60.16	39.84	673.25	19.25	26.5	25.15	68.17
896	60	40	671	19		25	68
897	59.5	40.5	666.5	18			67.65
898	59	41	662	17	26	24.69	67.3
899	58.5	41.5	655.5	16			67
900	58	42	649	15			66.7
900.5	57.75	42.25	647	14.75	25.5	24.23	66.52
901	57.5	42.5	645	14.5			66.35
901.5	57.25	42.75	643	14.25		24	66.17
902	57	43	641	14			66
903	56.5	43.5	636	13	25	23.77	65.5
904	56	44	631	12			65
905	55.5	44.5	626	11.5			64.5
906	55	45	621	11	24.5	23.31	64
907	54.5	45.5	616.5	10.5			63.65
908	54	46	612	10		23	63.3
909	53.5	46.5	607	9	24	22.85	62.65
910	53	47	602	8			62.3
911	52.5	47.5	595.5	7.5			61.9
912	52	48	591	7	23.5	22.39	61.5
913	51.67	48.33	586	6			61
914	51.33	48.67	581	5			60.5
915	51.5	49	576	4	23	21.94	60
916	50.5	49.5	571	3			59.6
917	50	50	560.5	2			59.3
918	49.67	50.33	562	1	22.5	21.48	59
919	49.33	50.67	554	.5			58.5
920	49	51	550	Proof			58
921	48.5	51.5	545	1 U. P.	22	21.02	57.5
922	48	52	540	2			57
923	47.5	52.5	535.5	3	21.5	20.56	56.5
924	47	53	531	4			56
925	46.5	53.5	526	5			55.5

Sp. Gr. at 60° Fah.	100 parts contain of		1000 parts contain of Standard Alc. Sp. Gr. 825.	Sikes.	Baumé.	Cartier.	Per Cent. of Alcohol, Sp. Gr. 796 by volume. Gay Lussac.
	Alcohol Sp. Gr. 796. By Weight.	Water.					
926	46	54	521	6 U. P.	21	20.10	55
927	45.5	54.5	515.5	6.5			54.5
928	45	55	510	7			54
929	44.5	55.5	505	8			53.5
929.5	44.25	55.75	502.5	8.5	20.5	19.64	53.25
930	44	56	500	9			53
931	43.67	56.33	495.5	10			52.5
932	43.33	56.67	489	11			52
933	43	57	484	12	20	19.18	51.5
934	42.5	57.5	479	13		19	51
935	42	58	472.5	14			50.5
936	41.5	58.5	468	15	19.5	18.72	50
937	41	59	462	16			49.5
938	40.5	59.5	456	17			49
939	40	60	450	18	19	18.26	48.5
940	39.5	60.5	444	19			48
940.5	39.25	60.75	441	19.5		18	47.63
941	39	61	438	20			47.25
942	38.5	61.5	432	21	18.5	17.80	46.5
943	38	62	426.5	22			45.5
944	37.5	62.5	421	23			45
945	37	63	416	23.5	18	17.35	44.75
946	36.5	63.5	411	24			44
947	36	64	399	25		17	43.5
948	35.5	64.5	397	26	17.5	16.89	43
949	35	65	389.5	27			42.25
950	34.5	65.5	382	28			41.5
951	34	66	376	29.5	17	16.43	40
952	33.5	66.5	370	31			40.5
953	33	67	364	32.5			39.75
954	32.5	67.5	358	34			39
955	32	68	352	35	16.5	16.3	38.5
956	31.5	68.5	346	36		16	38
957	31	69	339.5	37.5			37.25
958	30	70	333	39			36.5
959	29.5	70.5	324	40.5	16	15.51	35.75
960	29	71	315	42			35
961	28.5	71.5	307.5	43.5			34.5
962	28	72	300	45	15.5	15	34
963	27	73	292.5	46.5			33
964	26.5	73.5	285	48			32
965	26	74	277.5	49.5	15	14.59	31
966	25.5	74.5	270	51			30
967	25	75	261.5	52.5			29
968	24	76	253	54			28
968.5	23.75	76.25			14.5	14.13	27.5
969	23.5	76.5	244.5	55.5			27
970	23	77	236	57			26

Sp. Gr. at 60° Fah.	100 parts contain of		1000 parts contain of Standard Alc. Sp. Gr. 825.	Sikes.	Baumé	Cartier.	Per cent. of Alcohol. Sp. Gr. 796 by volume. Gay Lussac.
	Alcohol	Water.					
	Sp. Gr. 796 By Weight.	Weight.					
971	22.5	77.5	227	58.5 U.P.			25
972	22	78	218	60	14	13.67	24
973	21	79	209	62			23
974	20	80	200	64			22
975	19	81	195	66	13.5	13.21	21
976	18.5	81.5	190.5	68			20
977	18	82	183.5	70			19
978	17	83	175	72	13	12.76	18
979	16	84	163	73.5			17
980	15.5	84.5	150	75			16
981	15	85	143	76			15
982	14	86	135	77	12.5	12.30	14
983	13.5	86.5	128	78.5			13
984	13	87	120	80			12
985	12.5	87.5	112	81			11.25
986	12	88	105	82	12	11.84	10.5
987	11	89	98	83.5			9.75
988	10	90	90	85			9
989	9	91	82	87	11.5	11.38	8
990	8	92	75	89			7
991	7	93	67.5	90.5			6.5
992	6	94	60	92			6
993	5.5	94.5	52.5	93.5	11	10.92	5
994	5	95	45	95			4
995	4	96	37.5	95.5			3.5
996	3.5	96.5	30	96	10.5	10.46	3
997	3	97	22.5	97			2
998	2	98	15	98			1
999	1	99	7.5	99			.5
1000	0	100	0	100	10	10	0

Table of the Quantity of Liquid Muriatic Acid of sp. gr. 1.2, of Muriatic Acid Gas, and of Chlorine, in 100 parts of Liquid Acid of different densities.

Sp. Gr.	Liquid Acid of Sp. gr. 1.2.	Acid Gas.	Chlorine.	Sp. Gr.	Liquid Acid of Sp. gr. 1.2.	Acid Gas.	Chlorine.
1.2000	100	40.777	39.675	1.1102	55	21.822	22.426
1.1910	95	38.738	37.692	1.1000	50	20.388	19.837
1.1822	90	36.700	35.707	1.0899	45	18.348	17.854
1.1721	85	34.660	33.724	1.0798	40	16.310	15.870
1.1701	84	34.252	33.328	1.0697	35	14.271	13.887
1.1620	80	32.621	31.746	1.0597	30	12.233	11.903
1.1599	79	32.213	31.343	1.0497	25	10.194	9.919
1.1515	75	30.582	29.757	1.0397	20	8.155	7.935
1.1410	70	28.544	27.772	1.0298	15	6.116	5.951
1.1308	65	26.504	25.789	1.0200	10	4.078	3.968
1.1206	60	24.466	23.805	1.0100	5	2.039	1.984

Quantities of Anhydrous and of Liquid Sulphuric Acid contained in Mixtures of Oil of Vitriol and Water at different Densities. (Ure.)

Specific Gravity.	Liq. Acid Sp. Gr. 1.8485 in 100.	Dry Acid in 100	Specific Gravity.	Liq. Acid in 100.	Dry Acid in 100.
1.8485	100	81.54	1.3884	50	40.77
1.8475	99	80.72	1.3788	49	39.95
1.8460	98	79.90	1.3697	48	39.14
1.8439	97	79.09	1.3612	47	38.32
1.8410	96	78.28	1.3530	46	37.51
1.8376	95	77.46	1.3440	45	36.69
1.8336	94	76.65	1.3345	44	35.88
1.8290	93	75.83	1.3255	43	35.06
1.8233	92	75.02	1.3165	42	34.25
1.8179	91	74.20	1.3080	41	33.43
1.8115	90	73.39	1.2999	40	32.61
1.8043	89	72.57	1.2913	39	31.80
1.7962	88	71.75	1.2826	38	30.98
1.7870	87	70.94	1.2740	37	30.17
1.7774	86	70.12	1.2654	36	29.35
1.7673	85	69.31	1.2572	35	28.54
1.7570	84	68.49	1.2490	34	27.72
1.7465	83	67.68	1.2409	33	26.91
1.7360	82	66.86	1.2334	32	26.09
1.7245	81	66.05	1.2260	31	25.28
1.7100	80	65.23	1.2184	30	24.46
1.6993	79	64.42	1.2108	29	23.65
1.6870	78	63.60	1.2032	28	22.83
1.6750	77	62.78	1.1956	27	22.01
1.6630	76	61.97	1.1876	26	21.20
1.6520	75	61.15	1.1792	25	20.38
1.6415	74	60.34	1.1706	24	19.57
1.6321	73	59.52	1.1626	23	18.75
1.6204	72	58.71	1.1549	22	17.94
1.6090	71	57.89	1.1480	21	17.12
1.5975	70	57.08	1.1410	20	16.31
1.5868	69	56.26	1.1330	19	15.49
1.5760	68	55.45	1.1246	18	14.68
1.5648	67	54.63	1.1165	17	13.86
1.5503	66	53.82	1.1090	16	13.05
1.5390	65	53.00	1.1019	15	12.23
1.5280	64	52.18	1.0953	14	11.41
1.5170	63	51.37	1.0887	13	10.60
1.5066	62	50.55	1.0809	12	9.78
1.4960	61	49.74	1.0743	11	8.97
1.4860	60	48.92	1.0682	10	8.15
1.4760	59	48.11	1.0614	9	7.34
1.4660	58	47.29	1.0544	8	6.52
1.4560	57	46.48	1.0477	7	5.71
1.4460	56	45.66	1.0405	6	4.89
1.4360	55	44.85	1.0336	5	4.08
1.4265	54	44.03	1.0268	4	3.26
1.4170	53	43.22	1.0206	3	2.446
1.4073	52	42.40	1.0140	2	1.63
1.3977	51	41.58	1.0074	1	0.8154

Quantities of Anhydrous and of Liquid Nitric Acid contained in Mixtures of Nitric Acid and Water at different Densities. (Ure.)

Specific Gravity.	Liq. Acid Sp. Gr. 1.5 in 100.	Dry Acid in 100.	Specific Gravity.	Liq. Acid in 100.	Dry Acid in 100.
1.5000	100	79.700	1.2947	50	39.850
1.4980	99	78.903	1.2887	49	39.053
1.4960	98	78.106	1.2826	48	38.256
1.4940	97	77.309	1.2765	47	37.459
1.4910	96	76.512	1.2705	46	36.662
1.4880	95	75.715	1.2644	45	35.865
1.4850	94	74.918	1.2583	44	35.068
1.4820	93	74.121	1.2523	43	34.271
1.4790	92	73.324	1.2462	42	33.474
1.4760	91	72.527	1.2402	41	32.677
1.4730	90	71.730	1.2341	40	31.880
1.4700	89	70.933	1.2277	39	31.083
1.4670	88	70.136	1.2212	38	30.286
1.4640	87	69.339	1.2148	37	29.489
1.4600	86	68.542	1.2084	36	28.692
1.4570	85	67.745	1.2019	35	27.895
1.4530	84	66.948	1.1958	34	27.098
1.4500	83	66.135	1.1895	33	26.301
1.4460	82	65.354	1.1833	32	25.504
1.4424	81	64.557	1.1770	31	24.707
1.4385	80	63.760	1.1709	30	23.900
1.4346	79	62.963	1.1648	29	23.113
1.4306	78	62.166	1.1587	28	22.316
1.4269	77	61.369	1.1426	27	21.519
1.4228	76	60.572	1.1465	26	20.722
1.4189	75	59.775	1.1403	25	19.925
1.4147	74	58.978	1.1345	24	19.128
1.4107	73	58.181	1.1286	23	18.331
1.4065	72	57.384	1.1227	22	17.534
1.4023	71	56.587	1.1168	21	16.737
1.3978	70	55.790	1.1109	20	15.940
1.3945	69	54.993	1.1051	19	15.143
1.3882	68	54.196	1.0993	18	14.346
1.3833	67	53.399	1.0935	17	13.549
1.3783	66	52.602	1.0878	16	12.752
1.3732	65	51.805	1.0821	15	11.955
1.3681	64	51.068	1.0764	14	11.158
1.3630	63	50.211	1.0708	13	10.361
1.3579	62	49.414	1.0651	12	9.564
1.3529	61	48.617	1.0595	11	8.767
1.3477	60	47.820	1.0540	10	7.970
1.3427	59	47.023	1.0485	9	7.173
1.3376	58	46.226	1.0430	8	6.376
1.3323	57	45.429	1.0375	7	5.579
1.3270	56	44.632	1.0320	6	4.782
1.3216	55	43.835	1.0267	5	3.985
1.3163	54	43.038	1.0212	4	3.188
1.3110	53	42.241	1.0159	3	2.391
1.3056	52	41.444	1.0106	2	1.594
1.3001	51	40.647	1.0053	1	0.797

Value and Atomic Composition of Hydrochloric Acid at Different Densities.

DAVY.		THOMSON.		
(Temp. 40° Bar. 30.)		Specific Gravity.	Real Acid in 100 of Liquid.	Atoms of Water to 1 of Acid.
Specific Gravity.	100 grains contain of Hydroc. Acid Gas.			
1.21	42.43	1.203	40.66	6
1.20	40.80	1.179	37.00	7
1.19	38.38	1.162	33.95	8
1.18	36.36	1.149	31.35	9
1.17	34.34	1.139	29.13	10
1.16	32.32	1.128	27.21	11
1.15	30.30	1.119	25.52	12
1.14	28.28	1.112	24.03	13
1.13	26.26	1.106	22.70	14
1.12	24.24	1.100	21.51	15
1.11	22.30	1.096	20.44	16
1.10	20.20	1.090	19.47	17
1.09	18.18	1.086	18.59	18
1.08	16.16	1.082	17.79	19
1.07	14.14	1.087	17.05	20
1.06	12.12			
1.05	10.10			
1.04	8.08			
1.03	6.06			
1.02	4.04			
1.01	2.02			

Specific Gravity of Acetic Acid at different degrees of Dilution.

THOMSON.				
Atoms of Acid.		Atoms of Water.		Specific Gravity at 60°.
1	+	1	=	1.06296
1	+	2	=	1.07060
1	+	3	=	1.07084
1	+	4	=	1.07132
1	+	5	=	1.06820
1	+	6	=	1.06708
1	+	7	=	1.06349
1	+	8	=	1.05974
1	+	9	=	1.05794
1	+	10	=	1.05439

*Quantities of Ammonia in Solutions
of different Specific Gravities.*

*Strengths of Solutions of Ammonia
of different Specific Gravities, and
their respective boiling points.*

DAVY.			DALTON.			
100 parts Specific Gravity,		of Ammonia.	Specific Gravity.	Grs. of Am- monia in 100 grs. of liquid.	Boiling Point.	Vol. of Gas in one vol. of liquid.
8750	contain	32.50	850	35.3	26	494
8875	"	29.25	860	32.6	38	456
9000	"	26.00	870	29.9	50	419
9054	"	25.37	880	27.3	62	382
9166	"	22.07	890	24.7	74	346
9255	"	19.54	900	22.2	86	311
9326	"	17.52	910	19.8	98	277
9385	"	15.88	920	17.4	100	244
9435	"	14.53	930	15.1	122	211
9476	"	13.46	940	12.8	134	180
9513	"	12.40	950	10.5	146	147
9545	"	11.56	960	8.3	158	116
9573	"	10.82	970	6.2	173	87
9597	"	10.17	980	4.1	187	57
9619	"	9.60	990	2.0	196	28
9612	"	9.50				

*Quantity of Anhydrous Potassa con-
tained in Solutions of different
Specific Gravities.*

*Quantities of Anhydrous Soda con-
tained in Solutions of different
Specific Gravities.*

DALTON.			DALTON.		
Specific Gravity.	Potassa Per cent.	Boiling point.	Specific Gravity.	Dry Soda per cent.	Boiling Point.
1.68	51.2	329°	1.85	63.6	600°
1.60	46.7	290	1.72	53.8	400
1.52	42.9	276	1.63	46.6	300
1.47	39.6	265	1.56	41.2	280
1.44	36.8	255	1.50	36.8	265
1.42	34.4	246	1.47	34.0	255
1.39	32.4	240	1.44	31.0	248
1.36	29.4	234	1.40	29.0	242
1.33	26.3	229	1.36	26.0	235
1.28	23.4	224	1.32	23.0	228
1.23	19.5	220	1.29	19.0	224
1.19	16.2	218	1.23	16.0	230
1.15	13.0	215	1.18	13.0	217
1.11	9.5	214	1.12	9.0	214
1.06	4.7	213	1.06	4.7	213

SPECIFIC GRAVITIES OF SOME OF THE PREPARATIONS ORDERED IN THE PHARMACOPŒIAS.

The London Pharmacopœia directs the Specific Gravity to be taken at a temperature of 62° Fahr.
The Edinburgh, Dublin and U. S. Pharmacopœias, at 60° Fahr.

		Sp. Gr.
Acetum Destillatum	Edin.	1.005
	Dublin	1.005
Acidum Aceticum	London	1.048
	U. S.	1.063
		to
	Edin.	1.068
	Dublin	1.074
Dilutum	Dublin	1.005
Hydrochloricum	London, U. S.	1.160
	Edin.	1.170
	Dublin	1.160
Dilutum	Edin.	1.050
	U. S.	1.046
	Dublin	1.080
Hydrocyanicum	Dublin	998
Nitricum	London, U. S.	1.500
	Edin.	1.500
Dilutum	London U. S.	1.080
	Edin.	1.077
	Dublin	1.280
Phosphoricum Dilutum	London	1.064
Sulphuricum	London, U. S.	1.845
	Edin.	1.845
	Dublin	1.845
Sulphuricum venale	Dublin	1.850
Sulphuricum Dilutum	London	1.110
	Edin. U. S.	1.090
	Dublin	1.084
Æther Nitrosus	Dublin	0.900
Sulphuricus	London, U. S.	0.750
	Edin.	0.735
	Dublin	0.766
Alcohol	London	0.815
	U. S.	0.835
	Edin.	0.796
	Dublin	0.810
Dilutum	U. S.	0.935
Aqua Destillata	L. E. D.	1.000
Ammonia	Edin.	0.960
	Dublin	0.950
Acetatis	Edin.	1.011
	Dublin	1.011
Ammonia Carbonatis	Dublin	1.090
Baryta Muriatis	Dublin	1.230
Calcis Muriatis	Dublin	1.202
Potassæ	Edin.	1.072
	Dublin	1.080
Carbonatis	Dublin	1.320
Potassii Sulphureti	Dublin	1.117
Soda Carbonatis	Dublin	1.024

		Sp. Gr.
Liquor Ammoniae	London	0.960
— Fortior	London, U. S.	0.882
— Plumbi Diacetatis	London	1.260
— Potassæ	London	1.063
— Carbonatis	London	1.473
Oleum Æthereum	London	1.05
—	U. S.	1.096
Spiritus Æthereus Nitrosus	Dublin	0.850
— Ætheris Nitrici	London, U. S.	0.834
—	Edin.	0.847
— Sulphurici	Edin.	0.809
— Ammoniae	London	0.860
—	U. S.	0.831
— Aromaticus	London	0.914
— Fœtidus	London	0.861
— Rectificatus	London	0.838
—	Edin.	0.838
—	Dublin	0.840
— Tenuior	London	0.920
—	Edin.	0.912
—	Dublin	0.919
Tinctura Ferri Sesquichloridi	London	0.992

FORMULÆ FOR COOLING OR FREEZING MIXTURES.

(MR. WALKER.)

FRIGORIFIC MIXTURES, WITHOUT ICE.

Mixtures.	Parts.	Thermometer sinks.	Degree of cold produced.
Muriate of Ammonia,	5	From + 50° to + 10° = 40	
Nitrate of Potassa,	5		
Water,	16		
Muriate of Ammonia,	5	From + 50° to + 4° = 46	
Nitrate of Potassa,	5		
Sulphate of Soda,	8		
Water,	16		
Nitrate of Ammonia,	1	From + 50° to + 4° = 46	
Water,	1		
Nitrate of Ammonia,	1	From + 50° to — 7° = 57	
Carbonate of Soda,	1		
Water,	1		
Sulphate of Soda,	3	From + 50° to — 30° = 80	
Diluted Nitric Acid,	2		
Sulphate of Soda,	6	From + 50° to — 10° = 60	
Nitrate of Ammonia,	4		
Nitrate of Potassa,	2		
Diluted Nitric Acid,	4		

Mixtures.	Parts.	Thermometer sinks.	Degree of cold produced.
Sulphate of Soda,	6	} From + 50° to — 14° = 64	
Nitrate of Ammonia,	5		
Diluted Nitric Acid,	4		
Phosphate of Soda,	9	} From + 50° to — 12° = 62	
Diluted Nitric Acid,	4		
Phosphate of Soda,	9	} From + 50° to — 21° = 71	
Nitrate of Ammonia,	6		
Diluted Nitric Acid,	4		
Sulphate of Soda,	8	} From + 50° to — 3° = 53	
Muriatic Acid,	5		
Sulphate of Soda,	}	} From + 50° to — 3° = 53	
Sulphuric Acid,			

FRIGORIFIC MIXTURES, WITH ICE.

Snow or pounded Ice,	2	}	to — 5°
Salt,	1		
Snow or pounded Ice,	2	} From any temperature.	to — 12°
Common Salt,			
Muriate of Ammonia,	1		to — 18°
Snow or pounded Ice,	24		
Common Salt,	10		
Muriate of Ammonia,	5		
Nitrate of Potassa,	5		
Snow or pounded Ice,	12	}	to — 25°
Common Salt,	5		
Nitrate of Ammonia,	5		
Snow,	3	}	From + 32° to — 23° = 55
Diluted Sulphuric Acid,	2		
Snow,	8	}	From + 32° to — 27° = 59
Muriatic Acid,	5		
Snow,	7	}	From + 32° to — 30° = 62
Diluted Nitric Acid,	4		
Snow,	4	}	From + 32° to — 40° = 72
Chloride of Calcium,	5		
Snow,	2	}	From + 32° to — 50° = 82
Cryst. Chloride of Calcium,	3		
Snow,	3	}	From + 32° to — 51° = 84
Potassa,	4		

COMBINATION OF FRIGORIFIC MIXTURES.

Mixtures.	Parts.	Thermometer sinks.	Degree of cold produced.
Phosphate of Soda,	5}	From 0° to — 34° = 34	
Nitrate of Ammonia,	3}		
Diluted Nitric Acid,	4}		
Phosphate of Soda,	3}	From — 34° to — 50° = 16	
Nitrate of Ammonia,	2}		
Diluted Mixed Acids,	4}		
Snow,	8}	From 10° to — 56° = 46	
Diluted Sulphuric or Nitric Acid,	3}		
Snow,	3}	From — 0° to — 46° = 46	
Diluted Nitric Acid,	2}		
Snow,	1}	From — 20° to — 60° = 40	
Diluted Sulphuric Acid,	1}		
Snow,	3}	From + 20° to — 48° = 68	
Chloride of Calcium,	4}		
Snow,	3}	From + 10° to — 54° = 64	
Chloride of Calcium,	4}		
Snow,	2}	From + 15° to — 68° = 33	
Chloride of Calcium,	3}		
Snow,	1}	From 0° to — 66° = 66	
Cryst. Chloride of Calcium,	2}		
Snow,	1}	From — 40° to — 73° = 33	
Cryst. Chloride of Calcium,	3}		
Snow,	1}	From — 68° to — 91° = 23	
Diluted Sulphuric Acid,	10}		

EFFECTS OF TEMPERATURE.

	Degrees below Zero.
Greatest artificial cold produced by the evaporation of a mixture of solid carbonic acid and ether, <i>in vacuo</i> , by Faraday,	160
Ditto, in the open air, by Thilorier,	135
Solid compound of alcohol and carbonic acid fuses,	131
Greatest artificial cold produced by Walker,	91
Strongest nitric acid freezes,	55
Sulphuric ether congeals,	47
Liquid Ammonia freezes,	46
Mercury freezes,	39
Proof spirit and brandy freeze,	7

Degrees
above Zero.

Solution of 1 salt in 3 water, freezes,.....	4
Solution of 1 salt in 4 water, freezes,.....	7
Mixture of 1 alcohol 3 water, freezes,.....	7
Solution of salammoniac in 4 water,.....	8
Oil of turpentine freezes,.....	16
Strong wines freeze,.....	20
Fluoric acid freezes,.....	23
Oils of bergamot and cinnamon,.....	23
Vinegar freezes,.....	28
Milk freezes,.....	30
Ice melts,.....	32
Olive oil freezes,.....	36
Glacial acetic acid solidifies,.....	36
Medium temperature of the surface of the globe,.....	50
Medium temperature of England,.....	52
Oil of aniseed freezes,.....	64
Lard melts,.....from 90 to 97	
Heat of human blood,.....	98
Phosphorus melts,.....	99
Stearine from hogs' lard melts,.....	109
Spermaceti melts,.....	112
Tallow melts, (Thomson,).....	92
————(Nicholson,).....	127
Bees' wax melts,.....	142
Ambergris melts, (La Grange,).....	145
Potassium melts, (Fownes,).....	150
————(Daniell,).....	136
Bleached wax melts, (Nicholson,).....	155
Sodium perfectly fluid,.....	200
Iodine fuses, (Gay Lussac,).....	210
————(Fownes,).....	225
Sulphur fuses,.....	226
Camphor fuses,.....	303
Tin fuses,.....	442
Bismuth fuses,.....	476
Lead fuses,.....	594
Zinc fuses,.....	700
Antimony fuses,.....	809
Red heat, (Daniell,).....	980
Heat of common fire, (Daniell,).....	1140
Brass fuses, (Daniell,).....	1869
Silver fuses, (Daniell,).....	2233
Iron fuses,.....	3479

TEMPERATURES AT WHICH CERTAIN SOLIDS AND LIQUIDS ARE VOLATILIZED.

Liquid sulphurous acid boils, (<i>anhydrous</i>),.....	14
Ether boils,.....	98
Fuming sulphurous acid boils, (<i>solution</i>),.....	113

Degrees
above Zero.

Bisulphuret of carbon boils,.....	126
Liquid ammonia boils,.....	140
Pyroligneous spirit boils,.....	150
Alcohol boils,.....	176
———— (Black,).....	174
———— sp. gr. 0.800, (Henry,).....	172
Water boils,.....	212
Phosphorus distils, (Pelletier,).....	219
Water saturated with sea salt boils,.....	225
Nitric acid boils, (sp. gr. 1. 5,).....	187
White oxide of arsenic sublimes,.....	283
Oil of turpentine boils, (Ure,).....	304
Petroleum boils, (Ure,).....	316
Metallic arsenic sublimes,.....	540
Phosphorus boils in close vessels.....	554
Sulphur boils,.....	570
Sulphuric acid boils, (Dalton,).....	590
———— (Black,).....	546
———— (Fownes,).....	620
Linseed oil boils,.....	600
Mercury boils,.....	662

BOILING POINTS OF SATURATED SOLUTIONS.

Degr.

Alum,.....	220
Muriate of ammonia,.....	236
Oxalate of ammonia,.....	218
Tartrate of ammonia,.....	230
Chloride of barium,.....	222
Nitrate of baryta,.....	214
Acetate of copper,.....	214
Sulphate of copper,.....	216
Acetate of lead,.....	212
Chloride of calcium,.....	220
Bichloride of mercury,.....	214
Bicyanide of mercury,.....	214
Sulphate of nickel,.....	235
Chlorate of potass,.....	218
Nitrate of potass,.....	238
Quadroxalate of potass,.....	220
Acetate of soda,.....	256
Nitrate of soda,.....	246
Biborate of soda,.....	222
Carbonate of soda,.....	220
Phosphate of soda,.....	222
Nitrate of strontia,.....	224
Sulphate of zinc,.....	220
Boracic acid,.....	218

TEMPERATURES TO BE OBSERVED IN CERTAIN PHARMACEUTICAL OPERATIONS.

In the fermentation of saccharine solutions, the highest temperature should not exceed 86° . (Thomson.)

The lowest temperature at which they will ferment is 38° . (Thomson.)

The process of acetous fermentation is best conducted at a temperature of above 86° .

The temperature requisite to coagulate albumen varies with the state of dilution. If the quantity of albumen be so great that the liquid has a slimy aspect, a heat of 145° to 150° suffices, but in a very dilute condition, boiling is required. (Fownes.)

In the London and U. S. Pharmacopœias:

When a boiling heat is directed, a temperature is meant of 212° , F.

When a gentle heat is directed, a temperature is meant of from 90° to 100° .

The specific gravities of substances ordered in the London Pharmacopœia, are to be taken at a temperature of 62° .

A water-bath is that by which any substance, contained in a proper vessel, is exposed either to hot water, or the vapor of boiling water. A sand-bath is made of sand, to be gradually heated, in which anything is placed contained in a proper vessel.

Syrups are to be kept in a place where the temperature never exceeds 55° .

Vegetables, shortly after they have been gathered, those excepted which ought to be fresh, are to be lightly strewed, and dried as quickly as possible, with a gentle heat (90° to 100°); keep them afterward in proper vessels, excluded from the access of light and moisture.

In the Dublin Pharmacopœia:

By the term superior heat, is meant some degree between 200° and 212° .

When a medium heat is directed, a temperature is meant between 100° and 200° .

When an inferior heat is directed, a temperature is meant between 90° and 100° .

In the process of digestion, an inferior heat is to be applied, unless it should be otherwise directed. In the process of maceration, a heat should be applied between 60° and 90° .

In the Dublin, Edinburgh, and U. S. Pharmacopœias:

Whenever mention occurs of the specific gravity of any body, its temperature is supposed to be at 60° .

CHEMICAL ELEMENTS, WITH THEIR SYMBOLS AND EQUIVALENTS.

	Symbol.	Equivalent.
Aluminium,.....	Al.	Phillips, 10
Antimony, (Stibium,)	Sb.	Graham, 13.72
		Phillips, 65
Arsenic,.....	As.	Graham, 129.24
		Phillips, 38
Barium,.....	Ba.	Graham, 75.34
Bismuth,.....	Bi.	68
Boron,.....	B.	72
		Phillips, 20
		Graham, 10.91
Bromine,.....	Br.	78
Cadmium,.....	Cd.	56
Calcium,.....	Ca.	20
Carbon,.....	C.	6
Cerium,.....	Ce.	48
Chlorine,.....	Cl.	36
Chromium,.....	Cr.	28
Cobalt,.....	Co.	30
Columbium, {		
Tantalum, {	Ta.	185
Copper, (Cuprum,)	Cu.	32
Fluorine,.....	F.	18
Glucinium,.....	G.	Phillips, 18
		Graham, 26.54
Gold, (Aurum,).....	Au.	200
Hydrogen,.....	H.	1
Iodine.....	I.	126
Iridium,.....	Ir.	98
Iron, (Ferrum,)	Fe.	28
Latanium,.....	La.	—
Lead, (Plumbum,)	Pb.	104
Lithium,.....	L.	8
Magnesium,.....	Mg.	12
Manganese,.....	Mn.	28
Mercury, (Hydrargyrum,)	Hg.	Phillips, 202
		Graham, 101.48
Molybdenum,.....	Mo.	48
Nickel,.....	Ni.	28
Nitrogen or Azote,.....	N.	14
Osmium,.....	Os.	100
Oxygen,.....	O.	8
Palladium,.....	Pd.	54
Phosphorus,.....	P.	Phillips, 16
		Graham, 31.44
Platinum,.....	Pl.	98
Potassium, (Kalium,)	K.	40
Rhodium,.....	R.	52
Selenium,.....	Se.	40
Silicium or {		
Silicon, {	Si.	Phillips, 8
		Graham, 22.22
Silver, (Argentum,).....	Ag.	108
Sodium, (Natrium,).....	Na.	24
Strontium,.....	Sr.	44
Sulphur,.....	S.	16
Tellurium,.....	Te.	Phillips, 32
		Graham, 64.25
Thorium,.....	Th.	60
Tin, (Stannum,)	Sn.	58
Titanium,.....	Ti.	24
Tungsten, (Wolfram,).....	W.	100
Uranium,.....	U.	217
Vanadium,.....	V.	68
Yttrium,.....	Y.	32
Zinc,.....	Zn.	32
Zirconium,.....	Zr.	Phillips, 32
		Graham, 33.67

THE SOLUBILITY OF SALTS.

Name of Salt.	Sp. Gr.	Solubility in 100 parts Water.		Solubility in 100 parts Alcohol.	
		at 60°	at Boiling point.	at 60°	at Boiling point.
ALUMINA.					
	3.9 to 3.97				
Acetate of.....	1.245	Undetermined			
Arseniate of.....		Insoluble			
Borate of.....		Uncrystallizable			
Camphorate of.....		0.05			
Lactate of.....		Uncrystallizable			
Muriate of.....		Very soluble.....		100 at 54½°	
Nitrate of.....	1.645	Very soluble.....			100
Oxalate of.....		Uncrystallizable.....			2.91
Phosphate of.....		Insoluble			
Seleniate of.....		Insoluble			
Sulphate of.....		50			
Sulphate of, and Potash	1.71	5.4	133.33		
Sulphate of, and Soda...	1.6	100			
Sulphite of.....		Insoluble			
Tartrate of.....		Uncrystallizable.....		291	
Tartrate of, and Potash.		Uncrystallizable			
Tungstate of.....		Insoluble			
Urate and Lithate of...		Insoluble			
AMMONIA.					
Acetate of.....		Very soluble.....		Readily soluble	
Arseniate of.....		Soluble			
Binarseniate of.....		Soluble			
Arsenite of.....		Uncrystallizable			
Benzoate of.....		Soluble			
Boletate of.....		38			
Borate of.....		8½			0.416
Camphorate of.....		1		33	
Carbonate of (Sesqui)...		33 (Ure)			
		20 (Brande)			
Chlorate of.....		Very soluble			
Chromate of.....		Very soluble			
Citrate of.....		Difficultly crystallizable			
Ferrocyanide of.....		Very soluble			
Formate of.....		Soluble			
Hydriodate of (or Iodide of Ammonium) }		Very soluble			
Hydrocyanate of.....		Soluble			
Hydrosulphuret of.....		Very deliquescent			
Hypophosphite of.....		Soluble and deliquescent			
Hyposulphite of.....		Very soluble			
Iodate of.....		Sparingly soluble			
Lactate of.....		Uncrystallizable			
Meconate of.....		66			
Molybdate of.....		Soluble			
Muriate of (or Chloride) of Ammonium) }	1.52	36	100	{ 7.5 at 80° } Sp. gr. of spirits. } 7	
				{ 4.75 do } .900	
				{ 1.5 do } .872	
				.834	
				19.16	
Nitrate of.....	1.58	50	100		
Oxalate of.....	1.582	4.5	40.84		
Phosphate of.....	1.8	25 (Brande)			
Biphosphate of.....		Less soluble			
Phosphite of.....		Very soluble			
Purpurate of.....		0066	much more		
Pyrolithate of.....		Soluble			

Name of Salt.	Sp. Gr.	Solubility in 100 parts Water.		Solubility in 100 parts Alcohol.	
		at 60°	at Boiling point.	at 60°	at Boiling point.
AMMONIA.					
Suberate of.....	.....	Very soluble			
Succinate of.....	.....	Very soluble			
Sulphate of.....	.....	50 (Brande)	100		
Sulphite of.....	.....	100 (Ure)			
Tartrate of.....	.....	60.03	304.7		2.91
Tungstate of.....	.....	Soluble			
ANTIMONY.					
Acetate of.....	6.7	Soluble (Ure)			
Benzoate of.....	.....	Soluble (Ure)			
Tartrate of.....	.....	Very soluble (Brande)			
Potassio-tartrate of.....	.....	7	50		
BISMUTH.					
Acetate of.....	9.83	Soluble			
Arseniate of.....	.....	Insoluble			
Benzoate of.....	.....	Soluble.....		Sparingly	
Carbonate of.....	.....	Insoluble			
Chloride of.....	.....	Deliquescent			
Nitrate of.....	.....	Decomposed			
Phosphate of.....	.....	Soluble			
Sulphate of.....	.....	Decomposed			
BARYTA.					
Acetate of.....	4.	5 at 50°	10 at 212°		
Antimoniate of.....	1.828	88	96		
Antimonite of.....	.....	Insoluble			
Arseniate of.....	.....	Slightly			
Arsenite of.....	.....	Insoluble			
Arsenite of.....	.....	Difficultly			
Benzoate of.....	.....	Soluble			
Borate of.....	.....	Very sparingly			
Camphorate of.....	.....	Very sparingly			
Carbonate of.....	4.331	Very nearly insoluble			
Chlorate of.....	.....	25			
Chromate of.....	.....	Very sparingly			
Citrate of.....	.....	Difficultly soluble			
Ferrocyanuret of.....	.....	.0005	01		
Hydriodate of (or Iodide of Barium).....	.....	Very soluble			
Hydrosulphuret of.....	.....	11	50		
Hypophosphite of.....	.....	Very soluble			
Iodate of.....	.....	.33	1.6		
Lactate of.....	.....	Soluble			
Lithate of.....	.....	Insoluble			
Muriate of (or Chloride of Barium) (Anhydrous)	2.825	36.8	68.5	$\left\{ \begin{array}{l} 1 \text{ at } 80^{\circ} \dots \\ 0.29 \dots \\ 0.18 \dots \\ 0.09 \dots \end{array} \right\}$	$\left\{ \begin{array}{l} .900 \\ .848 \\ .834 \\ .817 \end{array} \right\}$
Muriate of (or Chloride of Barium) Cryst. }	2.83	43 (Brande)	78	$\left\{ \begin{array}{l} 1.56 \text{ at } 80^{\circ} \dots \\ 0.43 \dots \\ 0.32 \dots \\ 0.06 \dots \\ 0.25 \dots \end{array} \right\}$	$\left\{ \begin{array}{l} .900 \\ .848 \\ .834 \end{array} \right\}$
Nitrate of.....	2.9	$\left\{ \begin{array}{l} 8.18 \text{ at } 58.9^{\circ} \\ 35.18 \text{ at } 214.97^{\circ} \end{array} \right\}$			
Oxalate of.....	.....	Nearly insoluble			
Phosphate of.....	1.286	Insoluble			

Name of Salt.	Sp. Gr.	Solubility in 100 parts Water.		Solubility in 100 parts Alcohol.	
		at 60°	at Boiling point.	at 60°	at Boiling point.
BARYTA.					
Phosphite of.....	.....	0.25			
Pyrocitrate of.....	.....	.006		.02	
Sulphate of.....	4.3	Insoluble			
Sulphite of.....	1.694	Insoluble			
Tartrate of.....	.....	Slightly			
COBALT.					
	7.834				
Acetate of.....	.....	Soluble			
Antimoniate of.....	.....	Soluble			
Arseniate of.....	.....	Insoluble			
Borate of.....	.....	Scarcely			
Carbonate of.....	.....	Insoluble			
Lactate of.....	.....	.026 (Ure.)			
Muriate, or Chloride of.....	.....	Very soluble			
Nitrate of.....	.....	Soluble.....		100 at 54½°	
Oxalate of.....	.....	Insoluble			
Sulphate of.....	.....	4 (Brande).....		Insoluble	
Tartrate of.....	.....	Soluble			
COPPER.					
	8.895				
Acetate of.....	1.78		(Ure) 20		
Antimoniate of.....	.....	Insoluble			
Arseniate of.....	.....	Insoluble			
Benzoate of.....	.....	Slightly			
Borate of.....	.....	Insoluble			
Carbonate of.....	.....	Insoluble			
Chlorate of.....	.....	Soluble			
Chromate of.....	.....	Insoluble			
Citrate of.....	.....	Insoluble			
Ferrocyanide of.....	.....	Insoluble			
Fluoride of.....	.....	Soluble			
Formate of.....	1.815	12			
Hyposulphite of.....	.....	Soluble			
Muriate, or Chloride of.....	.....	Soluble.....		100 at 176°	
Dichloride of.....	.....	Nearly insoluble			
Nitrate of.....	2.174	Deliquescent			
Oxalate of.....	.....	Soluble?			
and Ammonia	.....	Soluble?			
and Potassa	.....	Soluble?			
and Soda	.....	Insoluble			
Phosphate of.....	1.4158	Insoluble			
Subnitrate of.....	.....	Insoluble			
Sulphate of.....	2.20	25		50	
Disulphate of.....	.....	Insoluble			
Trisulphate of.....	.....	Insoluble			
Sulphite of Protoxide.....	.....	Insoluble			
Sulphate of and Potassa	.....	Soluble			
and Ammonia	.....	Soluble			
Ammonio Subsulphate..	66.6				
Tartrate of.....	.....	Soluble			
Bitartrate of.....	.....	Less soluble			
Tartrate of and potassa..	.....	Soluble			
GOLD.					
	19.361				
Perchloride of.....	.....	Soluble			
Protochloride of.....	.....	Soluble			

Name of Salt.	Sp. Gr.	Solubility in 100 parts Water.		Solubility in 100 parts Alco- hol.	
		at 60°	at Boiling point.	at 60°	at Boiling point.
IRON.		7.788			
Acetate (Prot.).....	1.368	Soluble			
Acetate (Per.).....		Uncrystallizable			
Antimoniate of.....		Insoluble			
Arseniate of (Prot.)....	3.	Insoluble			
Arseniate of (Per.).....		Insoluble			
Benzoate of.....		Insoluble			
Borate of.....		Insoluble			
Citrate (Proto).....		Soluble			
Citrate (Bi proto).....		Sparingly soluble			
Citrate (Per.).....		{ Very soluble and un- crystallizable			
Ferrocyanide (Prus- sian Blue).....		Insoluble			
Fluoride of.....		Insoluble			
Gallate of Peroxide of...		Insoluble			
Hyposulphite of.....		Soluble			
Lactate of Protox. of...		Scarcely			
Molybdate of Protox of...		Insoluble			
Protochloride of.....		Soluble			
Perchloride of.....		Very soluble.....	100 at 176°		
Nitrate of Protoxide of...		Uncrystallizable			
Nitrate of Peroxide of...		Very soluble			
Oxalate of Protoxide of...		Soluble			
Oxalate of Peroxide of...		Scarcely			
Phosphate of.....	2.6	Insoluble			
Phosphate of Peroxide of		Nearly insoluble			
Superphosphate of.....		Nearly insoluble			
Succinate of Peroxide of		Insoluble			
Sulphate of (Cryst.)....	1.880	76.238 (Brande)	333.3		
Sulphate of (dry).....	2.64				
Persulphate of.....		Uncrystallizable.....	Soluble		
Hyposulphite of.....		Uncrystallizable			
Persulphate of and Po- tassa.....		Soluble			
Persulphate of and Ammonia.....		Soluble			
Tartrate (Proto.) of.....		0.25 (Dumas)			
Tartrate (Per.) of.....		Soluble			
Tartrate of and Potassa..		Uncrystallizable.....	Soluble		
LEAD.		11.35			
Acetate (Cryst.).....	2.345	27 (Bostock)	29	12.5 (Brande)	
Acetate (Anhyd.).....	2.57			Soluble	
Diacetate of.....		Soluble			
Antimoniate of.....		Insoluble			
Arseniate of.....		Insoluble			
Benzoate of.....		Insoluble			
Borate of.....		Insoluble			
Carbonate of.....	{ 6.4 to 6.75 }	{ Insoluble			
Citrate of.....		Nearly insoluble			
Chlorate of.....		Soluble			
Chloride of.....	1.823	3.33 (Brande)	4.5		
Chloride of (fused)....	5.13				
Chromate of.....	6.	Insoluble			
Ferrocyanuret of.....		Insoluble			
Gallate of.....		Insoluble			
Iodide of.....		0.08	0.5		
Hyposulphite of.....		Soluble			
Lactate of.....		Soluble (Ure.)			

Name of Salt.	Sp. Gr.	Solubility in 100 parts Water.		Solubility in 100 parts Alcohol.	
		at 60°	at Boiling point.	at 60°	at Boiling point.
LEAD.		11.35			
Superlactate of.....		Soluble			
Malate of.....		Scarcely			
Molybdate of.....		Insoluble			
Nitrate of.....	4.	13			
Dinitrate of.....		{ Scarcely at 60°, but much more so at 212°			
Oxalate of.....		Insoluble			
Phosphate of.....		Insoluble			
Phosphite of.....		Insoluble			
Succinate of.....		Insoluble			
Sulphate of.....		Not absolutely insoluble			
Sulphite of.....		Insoluble			
Tannate of.....		Insoluble			
Tartrate of.....		Almost insoluble			
and Potassa.		Insoluble (<i>Berzelius</i>)			
LIME.		2.3908 (<i>Kirwan</i>)			
Acetate of.....	1.005	Soluble.....		{ 2.4 at 80°.... } { .900 4.12..... } { .848 4.75..... } { .834 4.88..... } { .817	
Antimoniate of.....		Insoluble			
Arseniate of.....		Insoluble			
Arsenite of.....		Difficultly soluble			
Benzoate of.....		Sparingly soluble			
Borate of.....		Very difficultly			
Carbonate of (Anhyd.)...	2.7	Insoluble			
Chlorate of.....		Very soluble.....	Soluble		
Chromate of.....		Soluble			
Citrate of.....		Nearly insoluble			
Fluoride.....	3.15	Insoluble			
Hypophosphite of.....		{ Solubility nearly equal at all temperatures.			
Hyposulphate of.....		40.65 (<i>Brande</i>)	150		
Hyposulphite of.....		Very soluble			
Iodate of.....		20	100		
Iodide of calcium.....		Deliquescent			
Malate of.....		66	1.53		
Molybdate of.....		Insoluble			
Muriate (or Chloride) of Calcium.....	1.76	{ 200 at 32° 400 at 60° almost any quantity at 220°			
Nitrate of.....	1.62	25			161.66
Oxalate of.....		Insoluble.			
Phosphate of.....		Insoluble			
Biphosphate of.....		Soluble			
Subphosphate of.....	3.	Almost insoluble			
Succinate of.....		Difficultly soluble			
Sulphate of.....		0.301 at 50°			
Sulphite of.....		12.5			
Tartrate of.....	1.9009	{ Nearly insoluble at 60° but .16 at 212°			
Tungstate of.....		Insoluble			
LITHIA.					
Acetate of.....		Deliquescent			
Bicarbonate of.....		Slightly soluble			
Borate of.....		Soluble			

Name of Salt.	Sp. Gr.	Solubility in 100 parts Water.		Solubility in 100 parts Alcohol.	
		at 60°	at Boiling point.	at 60°	at Boiling point.
LITHIA.					
Carbonate of.....		1.....		Insoluble	
Chloride of Lithium....		Very deliquescent	.....		
Chromate of.....		Very soluble	.....		
Citrate of.....		Very difficultly soluble	.....		
Nitrate of.....		Very deliquescent	.....		
Oxalate of.....		Very deliquescent	.....		
Binoxalate of.....		Less soluble	.....		
Phosphate of.....		Insoluble	.....		
Sulphate of.....		Soluble	.....		
Tartrate of.....		Easily soluble	.....		
and Potassa.....		Easily soluble	.....		
and Soda....		Easily soluble			
MAGNESIA					
Acetate of.....	1.378	Very soluble		50 50 at 80° 21.25 Sp. gr. of Sp'ts. .547 .817 .900	
Arseniate of.....		Deliquescent	.....		
Arsenite of.....		Difficultly soluble	.....		
Benzoate of.....		Soluble	.....		
Borate of.....	2.566	Insoluble	.....		
Carbonate of.....		Very slightly	.....		
Chlorate of.....		Very soluble	.....		
Chloride of Magnesium	1.6	200 (Brande).....	.....		
Chromate of.....		Very soluble	.....		
Citrate of.....		Difficultly soluble	.....		
Iodide of Magnesium..		Soluble	.....		
Malate of.....		3.56 (Brande)	.....		
Molybdate of.....		6.66	8.35		
Nitrate of.....	1.736	100.....		50 50 at 80° 21.25 Sp. gr. of Sp'ts. .547 .817 .900 (Nearly insoluble in pure alcohol 11 sp. gr. .840)	
Oxalate of.....		Nearly insoluble	.....		
Phosphate of.....	1.55	6.66	.....		
and Ammonia.....		Sparingly soluble	.....		
Succinate of.....		Uncrystallizable	.....		
Sulphate of (dry).....		33.192	73.57		
Sulphate of (cryst.)....	1.76	68.042	150.71		
and ammonia.....	1.696	Soluble	.....		
and Potassa.....		Soluble	.....		
and Soda....		33.3	.....		
Sulphite of.....	1.38	5	.....		
and Ammonia.....		Difficultly soluble	.....		
Tartrate of.....		Insoluble	.....		
Tungstate of.....		Soluble			
MANGANESE.					
Acetate of.....		3.....		Soluble	
Ammonio-chloride of...		Soluble	.....		
Ammonio-sulphate of...		Soluble	.....		
Antimoniate of.....		Moderately soluble	.....		
Arseniate of.....		Insoluble	.....		
Benzoate of.....		Deliquescent (Brande)	.....		
Carbonate of.....		Insoluble	.....		
Chromate of.....		Soluble	.....		
Nitrate of.....		Very soluble.....	.....		
Oxalate of.....		Insoluble	.....		
Phosphate of.....		Nearly insoluble		Soluble	

Name of Salt.	Sp. Gr.	Solubility in 100 parts Water.		Solubility in 100 parts Alcohol	
		at 60°	at Boiling point.	at 60°	at Boiling point.
MANGANESE.					
Succinate of.....	.....	1 (Ure)			
Sulphate of.....	2.877	31 (Ure.) 50 (Brande)			
Hyposulphate of.....	.....	Deliquescent			
Sulphite of.....	.....	Insoluble			
Tungstate of.....	.....	Insoluble			
MERCURY.					
Acetate of (Prot.).....	.....	0.16 (Braconnot)			
Acetate of (Per.).....	.....	Readily soluble			
Arseniate of.....	.....	Insoluble			
Benzoate of.....	.....	Insoluble			
Borate of.....	2.66	Insoluble			
Bichloride of.....	5.2	6.25 (Brande)	33.3	42.6	85.2
	(Hasenfratz)			{ 10.74 at 50°	
	6.5			Sp'ts. sp. gr. .915	
	Graham			{ 43.66 at 50°	
	7.176	.00833 at 212° (Dumas)		Sp'ts. sp. gr. .818	
Chloride of.....	.....			(Graham)	
Chromate of.....	.....	Insoluble			
Citrate of.....	.....	Insoluble			
Bicyanuret of.....	.....		54		
Fluoride of.....	.....	Soluble			
Molybdate of.....	.....	Very sparingly			
Nitrate (Prot.).....	.....	{ Soluble and decom-			
		posed by excess.			
Nitrate (Per.).....	.....	Do. do.			
Oxalate of (Proto.).....	4.98	Scarcely			
Oxalate of (Per.).....	.....	Insoluble			
Sulphate of (Proto.).....	.....	0.20	0.33		
Sulphate of (Per.).....	.....	Decomposed			
Sulphate of (Sub.).....	6.444	.005	0.33		
Tartrate of.....	.....	Insoluble			
and Potassa	.....	Soluble			
NICKEL.					
	8.666				
Acetate of.....	.....	Very soluble			
Arseniate of.....	.....	Soluble (Ure)			
Carbonate of.....	.....	Insoluble			
Chloride of.....	.....	Soluble in hot water			
Nitrate of Protox.	.....	50.....		Soluble	
and Ammonia	.....	Soluble			
Oxalate of.....	.....	Insoluble			
Phosphate of.....	.....	Nearly insoluble			
Sulphate of.....	.....	33.3	185.71		
and Ammonia	.....	25			
and Potassa..	.....	11.1			
and Iron.....	.....	Soluble			
Tartrate of.....	.....	Very soluble			
PLATINUM.					
	23.000				
Protochloride of.....	.....	Soluble.....		{ Easily soluble, also in	
Perchloride of.....	.....	Soluble.....		{ Ether	
Protochloride of.....	.....	Soluble.....		Insoluble	
and Ammonium)	.....				
and Potassium.....	.....	Soluble.....		Insoluble	
and Sodium.....	.....	Uncrystallizable.....		Very soluble	

Name of Salt.	Sp. Gr.	Solubility in 100 parts Water.		Solubility in 100 parts Alcohol.	
		at 60°	at Boiling point.	at 60°	at Boiling point.
PLATINUM.		23.000			
Bichloride of..... and Ammonium..... and Potassium..... and Sodium..... and Barium.....	.....	Very sparingly		Soluble	
Protonitrate of.....	.....	Soluble			
Pernitrate of.....	.....	Soluble			
Protosulphate of.....	.....	Soluble			
Persulphate of.....	.....	Very soluble.....		{ Very soluble, also in Ether	
POTASSA.		1.706			
Acetate of.....	.....	100			200
Ammonio-oxalate of.....	.....	Soluble			
Ammonio-sulphate of.....	.....	13			
Ammonio-tartrate of.....	.....	Very soluble			
Antimoniate of.....	.....	Slightly			
Antimonite of.....	.....	Soluble			
Arseniate of.....	.....	Uncrystallizable.....		3.75	
Binarseniate of.....	.....	18.86 at 40°		Insoluble	
Arsenite of.....	.....	Uncrystallizable			
Benzoate of.....	.....	Very soluble			
Bibenzoate of.....	.....	10			
Borate of.....	.....	Soluble			
Camphorate of.....	.....	1	25		
Carbonate of.....	2.6	100			
Bicarbonate of.....	2.085	25	83		
Chlorate of.....	.....	6.03	60 at 188½°		
Chromate.....	2.6	48	extremely	Insoluble	
Bichromate.....	1.98	10	much more		
Citrate of.....	.....	Very soluble			
Columbate of.....	.....	Uncrystallizable			
Ferrocyanide of.....	1.83	33.3	100		
Iodide of Potassium.....	.....	143 at 65° (G. Lussac)		Sparingly	
Iodate of.....	.....	7.14 (Brande)			
Molybdate of.....	.....	Soluble			
Chloride of Potassium..	1.98	{ 29.21 at 66.83° } { 59.26 at 229.28° }	.....	{ 2.083 4.62 at 80° } { 1.66..... } { 0.38..... }	{ .900 .812 .834 }
Nitrate of.....	2.073	{ 29.31 at 64° } { 236.45 at 207° } { 285. at 238° }	.....		2.083
Oxalate of.....	.....	{ 50 (Ure) 30 (Brande) }	.....	{ 2.76 at 80° } { 1..... }	{ .900 .872 }
Binoxalate of.....	.....	10 (Brande) (Ure 100)			
Quadroxalate of.....	.....	66.66			2.91
Phosphate of.....	.....	Difficultly soluble			
Diphosphate of.....	.....	Soluble in hot water			
Biphosphate of.....	2.85	Very soluble			
Hypophosphite of.....	.....	Very deliquescent		Very soluble	
Hyposulphate of.....	.....	{ Difficultly sol. at 60° readily at 212			
Hyposulphite of..... and Silver	.....	Deliquescent Difficultly			
Succinate of.....	.....	Very soluble			
Sulphate of.....	2.67	{ 10.57 at 54° 26.33 at 214° 50 at 40° 200 at 220° }			
Bisulphate of.....	.....				

Name of Salt.	Sp. Gr.	Solubility in 100 parts Water.		Solubility in 100 parts Alco- hol.		
		at 60°	at Boiling point.	at 60°	at Boiling point.	
POTASSA.		1.706				
Sulphite of.....	1.586	100				
Tartrate of.....	1.556	100.....			0.416	
Bitartrate of.....	1.95	1.05	6.66		2.91	
Tartrovinat of.....		10	any quantity			
Tungstate of.....		Uncrystallizable				
Nitro-tungstate of.....		(Ure) 5				
SILVER.		10.474				
Acetate of.....		Very difficultly soluble				
Arseniate of.....		Insoluble				
Arsenite of.....		Insoluble				
Borate of.....		Difficultly soluble				
Chlorate of.....		25 (<i>Chenevix</i>)				
Chromate of.....		Very slightly				
Citrate of.....		Insoluble				
Molybdate of.....		Insoluble				
Chloride of (Fused)...	5.45	Insoluble				
Nitrate of (Cryst.)....	3.521	100	200		25	
Oxalate of.....		Insoluble				
Phosphate of.....	7.3	Insoluble				
Succinate of.....		Soluble				
Sulphate of.....		1.15				
Sulphite of.....		Very little soluble				
Hyposulphite of.....		Soluble				
and Potassa.....		Difficultly soluble				
Tartrate of.....		Soluble				
and Potassa.....		Soluble				
SODA.						
Acetate of.....	2.1	35	150			
Arseniate of.....	1.76	{10 (<i>Thomson</i>) 25 (<i>Ure</i>)				
Binarseniate of.....		Soluble				
and Potassa.....		Soluble				
Benzoate of.....		Very soluble				
Biborate of.....	1.740	8.033	50			
Carbonate of.....	1.62	50	100			
Bicarbonate of.....		7.6				
Chlorate of.....		33.3.....		Sol. in sp. rect.		
Chromate of.....		Very soluble.....		Sparingly		
Citrate of.....		100 or more (<i>Brande</i>)				
Iodide of Sodium.....		173				
Iodate of.....		7.3.....		Insoluble		
Molybdate of.....		Soluble		{5.8 at 80°} Sp.gr. .900		
Muriate of (or Chloride)	1.986	Equally soluble at all		{3.6.....} of .872		
of Sodium).....		temperatures. (<i>Berz.</i>)		{0.5.....} Sp'ts. .834		
		{33.3 at 60°} <i>Dumas</i>				
		{100 at 123°}				
		{50 at 60°} <i>Berzel.</i>				
		{73 at 32°} <i>Gay</i>			.958	
		{173 at 212°} <i>Lussac</i>		{10.5 at 80°} S.gr. {	.900	
		{80 at 32°}			of {	.872
		{22.7 at 50°} <i>Marx</i>			Spts. {	.834
		{55 at 61°}				
		{218.5 at 246°}				
Nitrate of.....	2.	{10.5 at 80°} S.gr. {		{.958		
		{0.38.....} Sp'ts. {		{.834		
Oxalate of.....		Sparingly soluble				
Phosphate of.....	1.33	25	50			
and ammonia.....	1.50	Soluble				
Biphosphate of.....		Very soluble				

Name of Salt.	Sp. Gr.	Solubility in 100 parts Water.		Solubility in 100 parts Alcohol.	
		at 60°	at Boiling point.	at 60°	at Boiling point.
SODA.					
Hypophosphite of		Very soluble		Very soluble	
Succinate of		Soluble			
Sulphate of (cryst.).....	1.44	{ 48.28 at 64° 322.12 at 91° 16.73 at 64° } <i>Gay Lussac</i>		Insoluble	
Sulphate of (dry).....		{ 50.65 at 91° 42.65 at 217° }			
Hyposulphate of.....		41.6	91	Insoluble	
Bisulphate of		50			
Sulphate of & Ammonia		Soluble			
Sulphite of.....	2.95	25			
Hyposulphite of.....		Deliquescent		Insoluble	
Tartrate of.....	1.980	56.37 (<i>Thomson</i>)		Insoluble	
and Potassa		20			
Tartrovinatate of.....		Soluble		{Sol. in sp. rect. but sparingly in absolute alc'l	
Tungstate of.....		25	50		
STRONTIA.					
Hydrate of.....		{ 0.625 at 60° 5. at 212° } (<i>Ure</i>)			
Acetate of.....		2	50		
Arseniate of.....		Very soluble			
Arsenite of.....		Sparingly soluble			
Borate of.....		Sparingly soluble			
Carbonate of.....	3.66	0.76			
Chlorate of.....		0.0651 at 212°		Soluble	
Chloride of Strontium..	2.83	Very soluble		Soluble	
Chromate of.....		50			
Citrate of.....		Insoluble (<i>Brande</i>)			
Ferrocyanuret of.....		Soluble			
Iodide of Strontium....		25			
Iodate of.....		25			
Nitrate of.....				113	
Oxalate of.....				0.52	
Phosphate of.....		Insoluble			
Phosphite of.....		Soluble			
Hypophosphite of.....		Very soluble			
Succinate of.....		Soluble			
Sulphate of.....		0.026 at 212°			
Hyposulphite of.....		20 (<i>Gay Lussac</i>)		Insoluble	
Hyposulphate of.....		22.22	66.66		
Tartrate of.....	1.837	0.67 at 170			
TIN.					
Acetate of.....	7.3	Soluble			
Arseniate of.....		Insoluble			
Borate of.....		Insoluble			
Nitrate Proto. of.....		Uncrystallizable			
Nitrate Per. of.....		Scarcely			
Oxalate of.....		Soluble			
Phosphate of.....		Insoluble			
Succinate of.....		Soluble			
Sulphate Proto. of.....		Crystallizable			
Sulphate Per. of.....		Uncrystallizable			
Tartrate of.....		Soluble			
and Potassa		Very soluble			

Name of Salt.	Sp. Gr.	Solubility in 100 parts Water.		Solubility in 100 parts Alco hol.	
		at 60°	at Boiling point.	at 60°	at Boiling point.
ZINC.	6.861 to 7.2				
Acetate of.....		Very soluble			
Antimoniate of.....		Very sparingly			
Borate of.....		Insoluble			
Chromate of.....		Sparingly			
Citrate of.....		Scarcely			
Chlorate of.....		Very soluble			
Chloride of.....	1.537	Very soluble		100 at 54½°	
Iodide of.....		Soluble			
Iodate of.....		Difficultly soluble			
Lactate of.....		2 (Ure)			
Nitrate of.....	2.0	Deliquescent			
Molybdate of.....		Insoluble			
Oxalate of.....		Nearly insoluble			
Phosphate of.....		Uncrystallizable			
Succinate of.....		Soluble			
Sulphate of.....	1.98	140 (Dumas)			
Sulphite of.....		81.81 at 220°.....		Insoluble	
Hyposulphite of.....		Soluble.....		Soluble	
Sulphate of and Nickel.		33.33			
Tartrate of.....		Difficultly soluble			
Tartrovinatate of.....		Soluble.....		Sparingly soluble	
Trisulphate of.....		Soluble			

SOLUBILITY OF ACIDS, BASES, ETC.

ACID.				
Arsenious				
Vitreous	3.7385	1.78 (Graham)	9.68	
Opake.....	3.699	2.9 (Graham)	11.47	
Benzoic		.50		
Boracic		3.9	33.3	20 at 176° (Henry)
Citric	1.0345	133.33	200	Soluble
Gallic		5	33.33	
Oxalic (Cryst.).....		11.5		
Succinic (Cryst.).....		4	33.33	74 at 166°
Tartaric.....	1.6	150 (Brande)	200	Soluble
Brucia.....		.1177	0.2	
Cinchonia.....		Insoluble	0.04	
Morphia		Nearly insoluble	1	
Quinia		Nearly insoluble	0.5	
Strychnia.....		0.04 (Graham)	0.15	
Camphor.....	0.9887	0.229		75 at 176°
Sugar Pur.....	1.5 to 1.6	200		24½ at 176°

SHOW COLORS FOR DRUGGISTS' SHOP WINDOWS.

BLUE.

No. 1.—Sulphate of copper ʒj , sulphuric acid ʒss , water ʒx .

No. 2.—Ammonio-sulphate of copper, ammonio-nitrate of nickel (see No. 5) and water.

No. 3.—Prussian blue gr. x , oxalic acid gr. xx , water ʒxvj .

No. 4.—Dissolve nickel in diluted sulphuric acid, add ammonia in excess and dilute with water.

No. 5.—Dissolve nickel in diluted nitric acid, add ammonia in excess and dilute with water.

No. 6.—To the green color made by formula No. 8 under that color, add sufficient aqua ammonia to make it blue.

GREEN.

No. 1.—Sulphate of copper ʒij , chloride of sodium ʒiv , water ʒxx .

No. 2.—Dissolve ʒj of nickel in ʒvj of nitric acid, and add Ov of water.

No. 3.—Dissolve nickel in dilute sulphuric acid, and dilute with water.

No. 4.—Dissolve sulphate of copper in water and add bichromate of potassa until the required color is produced.

No. 5.—Dissolve ammonio-sulphate of copper in water, and add bichromate of potassa until the required color is produced.

No. 6.—Dissolve sulphate of copper in water, and add nitric acid until the required color is produced.

No. 7.—Dissolve distilled verdigris with acetic acid, and dilute with water.

No. 8.—Dissolve a copper cent in nitric acid, and add enough of the solution to water or proof spirit, to give it the right shade.

LILAC.

No. 1.—Dissolve zaffre (impure oxide of cobalt) in hydrochloric acid, filter and add carbonate of ammonia in excess; to this add ammonio-sulphate of copper until the required color is produced.

No. 2.—Dissolve zaffre in hydrochloric acid, filter, and add carbonate of ammonia in excess; to this add ammonio-nitrate of nickel (see *Blue*, No. 5) until the required tint is produced.

ORANGE.

No. 1.—Dissolve bichromate of potassa in water until the required tint is produced.

No. 2.—The same as the last but adding some oil of vitriol or hydrochloric acid.

PINK.

No. 1.—Dissolve ʒij of zaffre in ʒvj of hydrochloric acid, filter, add solution of carbonate of ammonia in excess; then add fʒj of liquor potassæ, and dilute with water, to produce the required color.

No. 2.—Nitrate of cobalt may be used, with carbonate of ammonia, in the same way as the last.

PURPLE.

No. 1.—Sulphate of copper 3j , carbonate of ammonia 3jss , water Oijss.

No. 2.—The last color, with a small quantity of the *Pink* No. 1.

RED.

No. 1.—Macerate powdered cochineal in spirit of hartshorn, and dilute it with water.

No. 2.—Dissolve carmine in solution of ammonia, and dilute it with water.

No. 3.—Wash the best madder two or three times with cold water, then macerate it in solution of carbonate of ammonia, filter the solution, and dilute it with water.

No. 4.—Dissolve madder lake in solution of carbonate of ammonia.

No. 5.—Add a sufficient quantity of tincture of iodine to alcohol or proof spirit to produce the desired color. Should it fade renew the color by adding more tincture of iodine.

VIOLET.

Ammonio-sulphate of copper, diluted with water, and enough of the pink color No. 1 to produce the required tint.

YELLOW.

No. 1.—Bichromate of potassa 3vj , carbonate of potassa 3iv , water 3xvj .

No. 2.—Add a sufficient quantity of tincture of iodine to alcohol or proof spirit to make a bright straw color.

N. B. Alcohol answers better for colors than water or proof spirit, as there is seldom any precipitate or decomposition; beside, as it does not freeze in winter, there is no breaking of the show-bottles, which is apt to ensue when water is used.

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